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CATALOGUE

OF

LOPHOBRANCHIATE FISH

IN

THE COLLECTION

OF THE

BRITISH MUSEUM.

BY

J. J. KAUP, Ph.D. &c.

LONDON:
PRINTED BY ORDER OF THE TRUSTEES.
1856.

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PREFACE.

The object of this Catalogue is to give a description of all the species of Lophobranchous Fishes in the Collection of the British Museum, with an indication of their history and origin, and an account of the species to be found in other Collections which are desiderata to the National Museum.

Dr. Kaup observes that, "If my work has any value, it is chiefly owing to the liberality and great kindness of Professor Duméril, Director Temminck, Dr. Heckel, Dr. Rüppell, Professor Lichtenstein, and Dr. Krauss, who most kindly transmitted all the specimens of this Order from the French, Leyden, Vienna, Frankfort, Berlin, and Stuttgardt Museums, that I might compare them with the specimens in the British Museum, which has given me the means of comparing more than 2000 specimens of these fishes together, an advantage which no other Ichthyologist has hitherto enjoyed. From these sources I have been able to determine and describe ninety-five species, and to indicate one which appears to be distinct from any which has come under my examination. Of these ninety-five, fifty-three are to be found in two or more of the above-named collections; and of the other species, nineteen are peculiar to the

French, ten to the Leyden, seven to the Vienna, four to the British, and two to the Berlin Museums.

"Although I have described five or six times as many species as any of my predecessors, I am certain that hereafter we shall find a great number of new species, as the species of the West Coasts of Africa and America, and the shores of Australia and the Pacific Ocean are almost unknown to us, and there are evidently many gaps in the families and genera. Indeed our best works on Natural History must always be regarded as imperfect.

"You desired that I should give a list and short characters of the few species mentioned by preceding writers which I have not been able to identify with those that have come under my observation; but I have not considered this desirable, as the descriptions are too short, or wanting in precision, to be of any useful purpose, containing generally little more than the generic characters, instead of being comparative and distinctive of the species."

Sir John Richardson, M.D., F.R.S. &c., has most kindly compared Dr. Kaup's translation of the text with the original German version, to prevent any inaccuracies that might have occurred from Dr. Kaup's want of knowledge of the peculiarities of the English language.

JOHN EDWARD GRAY.

May 1, 1856.

CATALOGUE OF FISH.

Order I. LOPHOBRANCHII, *Cuvier.*

The gills, composed of small round tufts seated on the branchial arches, are so well hidden by the gill-cover (*operculum*) that only a small entrance to them is left in the membrane between the operculum and breast-ring. The nearly fleshless body is protected by bony rings. In most of the species the males perform the function of hatching the eggs, which for that purpose are deposited up to the time of the evolution of the young, either between the ventrals [*Solenostomus*], or in tail-pouches [*Hippocampus*], or in pouches on the breast and belly [*Doryrhamphus*], or in rows on the breast and belly [*Nerophis*], and are thus carried about by the fish. The egg-pouches may be compared to birds' nests, or to the skin-fold in which the Wandering Penguin [*Aptenodytes Patagonicus*] transports its egg; and remind one of the Marsupials among the Mammals.

Fam. 1. Solenostomidæ, *Kaup.*

Breast and belly distinctly separated. Mouth perforating the end of a long, compressed, leaf-like snout. The gills, which are covered as in other fish by a cutaneous gill-plate, are wholly exposed when the plate is raised.

Genus 1. SOLENOSTOMUS, (*Seba*) *Lacép.* 1803.

Snout sharp-edged on its dorsal and ventral aspects. A sharp denticulated ridge, passing from the occiput over the eyes and nostrils, disappears in the acute rostral crest. Surface of the forehead and occiput showing irregular acutely-edged lines. Gill-plate having three sharp lines, one of which runs along the middle. Back and breast acutely ridged; the leathery skin forms three rings, between which there are lines which increase to irregular folds in descending to the breast. Pectoral fin broad and short. The belly down to the tail-fin divided into rings and armed with three longitudinal rows of short spines. The first back-fin very long; the second as well as the anal rudimentary. Ventrals and caudal much developed.

In the males an egg-pouch is formed by the union of the inner borders of the ventrals to the skin of the belly. In the females the ventrals are free as in other fish.

1. Solenostomus paradoxus.

Solenostomus paradoxus, *Lacépède, Poiss.* v. p. 36.
Fistularia paradoxa, *Pall. Spicil. Zool.* viii. t. 4. f. 6.
Seba, Thes. t. 34. f. 4.

This is one of the strangest forms to be found in the whole class of fishes. The colour of a large specimen is blackish-brown; others are yellowish-brown dotted with black, except on the pectoral, second dorsal and anal. Some of the specimens have little skinny tags round the mouth and rostral tube, as represented in Pallas's figure. *Rad.*—D. 5—18 or 19; A. 18 or 19; C. 15; P. 27; V. 7.

Dr. Bleeker describes the colours in the following words:—"*Corpore roseo, toto nigro punctato; pinnis roseis; dorsali prima inter radium primum et tertium macula magna, pulchra, cærulea, ventralibus caudalique postice violaceis.*"

Five individuals exist in the Paris Museum. An old male, 4¾ inches long, brought from the Isle of France by M. Lienard; a smaller female from the same sea, by the Expedition of Capt. Duperrey; a black female from India, presented by Mr. Bosk; two young ones from New Guinea, by Quoy and Gaimard. Dr. Bleeker obtained his specimens in the sea of Hawaii and Ceram.

Fam. 2. Pegasidæ.

Breast extraordinarily developed, much broader than high, with a long pectoral extended on 9–10 firm spine-like rays. Gill-opening lateral, lying under the flatly expanded gill-plate, which is depressed to the ventral aspect of the body. The mouth like that of a Sturgeon, placed at the base of the elongated upper piece of the snout. The body furnished with three rings, having knobs or spines. Breast-ring unusually broad, extended between the two gill-plates, and armed with two spines, pointing forwards near the gill-opening. On the belly two cartilaginous ventrals, of two rays, stand out from the narrow ring, the inner ray being lengthened out into a filament. The tail is flatly expanded, four-cornered, and spiny, with a dorsal and anal fin of five rays, standing on 2–4 rings. Tail-fin having 10 firm rays.

Genus 1. PEGASUS, *Linn.*

Cataphractus, *Gronov.*

Diagnosis and description of the genus, the same as that of the family.

1. Pegasus laternarius, *Cuv.*

Pegasus laternarius, *Cuv. R. A.* ii. 365.

Diagn.—Spines of the four dorsal edges directed backwards. Tail with 9–11 rings. Body oval.

Descr.—The snout is less elongated, more poniard-shaped, without a leaf-like appendage. On the under piece of the snout there appear two distinct, narrow appendages directed downwards, and six spines. The edge of the upper snout-piece is finely denticulated, with coarser teeth near the point of the appendage. A medial row of very variable spines exists on the point of the snout. The orbits have thin expanded borders, strongly notched before and behind, and denticulated on the edges. No deep cavities on the concave forehead, or on the breast-ring nigh the occiput. In the concave back there are four longitudinal keels, of which the middle one is formed by three laterally compressed, short spinous projections pointing backwards. On the prominent side-lines only two such spines

are evolved. There are no distinct cross lines, such as bound depressions in *P. Draco*.

On its under aspect, the head is broader near the gill-plates than on its upper surface. Of the breast-pieces the median one is longer and higher than the lateral ones. Posteriorly the two middle dorsal keels run into the upper equally spinous edge of the tail, to form one row. On the 2nd, 3rd and 4th tail-rings there is a lateral spine. The colour is yellowish-brown irregularly speckled. Round blackish spots exist on the large pectoral fins, and there are four black specks on the silvery eyes.

In the Chinese insect-boxes we often find individuals having a shorter snout and broader body, but in all other respects the same. These are probably the females.

A great number of specimens exist in the British Museum and other collections. It is an inhabitant of the Indian and China Seas.

2. Pegasus natans, *Linn.*

Pegasus natans et volans, *Linn.*

Pegasus natans ♀ et volans ♂, *Richardson, Voy. of Sulph.* t. 50. f. 5, 10.

Pegasus pristis, *Bleeker.*

Cataphractus anceps, *Gron. Zoophyl.* 356. t. 12. f. 2, 3; *Cat.* 144.

Diagn.—Tail composed of twelve rings, of which the last six are confluent so as to form a long flat piece set on each side with spines. Body long and stretched out.

Descr.—The elongated, flat, thin snout is furnished on the under edge of the prominent upper piece with short spines pointing backwards. In the nasal region there is a median elevated spinous cornice, with one stouter spine. This cornice is accompanied by another spinous line which commences at the base of the acute border of the orbit. There is also a spine followed by two little ones at the beginning of the under border of the orbit. Forehead steep; occiput quite flat, tending to concave, and traversed by streaks rendered rough by four knobs on their edges. Body more depressed, and almost wholly flat. Knobs supporting diverging rays. First six tail rings hexagonal and spiniferous; last 3–6, with the exception of the terminal one, greatly elongated, and so confluent beneath that their numbers can be reckoned only by their spines. Breast and belly longer, more flat, without a sharp keel in the middle, and distinguished from the lateral ones merely by a line somewhat in relief. Colour yellowish-brown.

I have seen only the dried specimen in the Paris Museum, which was sent from Java by Leschenault. I believe that the male has the longer snout, and that the figured specimens are females. Bloch's engraving is not consonant with nature.

3. Pegasus Draco, *Linn.*

Pegasus Draco, *Bloch*, t. 109. f. 1, 2.
Gronov. Zoophyl. 12. f. 23.
Cataphractus Draco, *Gronov. Cat.*

Diagn.—Quadrilateral, with deep four-angled dorsal pits bordered with round knobs, and formed by the junction of round transverse eminences with the longitudinal ones of the back*.

Descr.—This species is more scarce in collections than the preceding ones, and seems to vary in its spotting in the males. In Bloch's figure the lateral leaf-like appendages of the snout appear to be oval; according to others these processes form a circular disk. The figure in the *Zoophyllacium* has the snout fashioned more like that of the preceding ones, and shows laterally a projecting edge.

No question has been made of Linnæus having been acquainted with *P. Draco* and *natans*, but some doubt may be entertained whether he distinguished the *laternarius* of Cuvier. Sir John Richardson gives two figures under the names of *volans* and *natans*, without specifically separating them. Schneider, in his *Systema*, p. 155, cites the *volans* of Renard, t. 35. f. 162 (not 102), giving to it the following character:—"*Rostro ensiformi longitudine thoracis, pellucido, utrinque retrorsum serrato*," which agrees with *natans*, but not with *laternarius*.

Fam. 3. Syngnathidæ, *Kp.*, *Bon.*

Diagn.—The small gill-opening very narrow, circular, and placed high up at the extremity of the gill-plate, close to the compressed occiput. A hinder back-fin only situated near the anus.

Descr.—Form more elongated, with or without pectorals:

* These pits with denticulated edges are best represented by the figure which Gronovius gives in his *Zoophyllacium*, which moreover exhibits no leaf-like appendages on the snout.

first dorsal and ventrals wanting. Anal fin very small, almost imperceptible or altogether wanting. The males carry the eggs in a pouch on the breast and belly, or in one on the tail, or placed on the skin of the breast and belly in rows. In some genera there are no egg-pouches, and we are as yet ignorant of the manner of their propagation. Such are the genera *Solenognathus* and *Phyllopteryx*.

Subfam. 1. HIPPOCAMPINÆ, *Bon.*

Diagn.—Tail generally prehensile at the tip, destitute of fins. Occiput more or less elevated.

Genus 1. HIPPOCAMPUS, *Cuv.*

Diagn.—The more or less elevated hind-head, with an occipital bone bearing a coronet surmounted by spines and knobs. Orbits spiny. Breast-ring with 2 or 3 spines. Body having from 10 to 13 rings more or less spiny. Tail-pouch of the males formed of thick skin, and opening at its commencement only. Tail prehensile like that of the Chameleon.

Descr.—Body heptagonal, laterally compressed; breast and belly acutely ridged. The lateral line connected with the under tail-ridge. The upper tail-ridge reaching as far as the middle of the dorsal fin; that fin generally rests on three rings, but in some species on four, five, or six, of which one or two only belong to the tail. The quadrangular tail exceeding the body in length. The spines and knobs on the body are generally more prominent in the young fish than in the old ones. Within the small opening of the egg-pouch the anal fin often lies hidden. All the males, without exception, have this fin, but it is frequently overlooked. The function of the prehensile tail is to suspend the body after the manner of the Chameleon or *Cebus*. Like the Chameleon also, the Seahorse-fish can direct one eye forwards and the other backwards. Professor Lichtenstein (*Wiegm. Archiv*, 1836, p. 129) observed a circular movement in the water, near the gill-openings; on the right side the whirl revolved to the left, and on the left side to the right, the rotation being symmetrical and constant like that of a *Rotifer* as seen under the microscope.

The *Hippocampi* inhabit every sea.

1. Hippocampus brevirostris, *Cuv.*

Hippocampus brevirostris, *Cuvier*, *R. A.* ii. 365.
Yarrell's British Fishes, ii. p. 342.
Hippocampus Rondeletii, *Willughby*, p. 157. i. 25. f. 3 (not very exact).

Diagn.—Length of the snout nearly twice that of the diameter of the orbit, or equal to that of the height of the dorsal fin. A sharp projection over the nostrils. Tenth body-ring as high as the 6th, 7th or 8th is long.

Descr.—This species resembles *H. guttulatus*, but is easily distinguished by its shorter snout, higher dorsal, and less prominent spines. The male is higher, and its 10th body-ring is as high as the 7th and 8th are long. The female is as high at the same part as the last six body-rings measure in length. The knobs on the 2nd, 5th, 8th and 11th body-rings project more than the others; and the same is the case with those on the 6th or 7th, the 8th or 9th, and 11th or 12th tail-rings. The occipital coronet has five prominences, whereof the medial distal one is connected with the sharp-ridged crest of the breast-ring. At certain times of life the cranial knobs are ornamented with skinny filaments, such as are represented in Willughby's figure.

It is not so variegated and spotted as *guttulatus*, but is marked by many white spots and dark and brownish stripes. Brown stripes set in white cross the eyes. Mr. Yarrell describes its tints in the following words:—"The general colour is a pale ash-brown, relieved by a changeable iridescence, and by variable tints of blue dispersed over different parts of the head, body and tail."

A great many specimens are deposited in the Paris, London, Leyden, Vienna, and other Museums. It is an extremely common species throughout the North Sea and the Adriatic.

2. Hippocampus japonicus, *Kp.*

Hippocampus brevirostris, *Temm. et Schl. Faun. Jap.* (partim).

Diagn.—At the 7th body-ring the height equals the length from the end of the snout to the breast-spine near the pectoral fin.

Descr.—This species greatly resembles *brevirostris* in the shortness of the snout, but the body measured from the rim of the belly to the edge of the back is comparatively higher than in individuals of *brevirostris* having the same length. Five young

examples, two of them males and three females, have the lower breast-spine forked, which is not the case with a larger specimen in a dry state. The high dorsal exhibits two black bands.

It inhabits the seas of Japan, and specimens exist in the Leyden Museum.

3. Hippocampus Monikei*, *Bleeker*.

Hippocampus Monikei, *Bleeker, Bijdr. d. Ichth. von Japan*, 1853, p. 16. f. 2.
Hippocampus brevirostris, *Temm. et Schl. Faun. Jap.* (partim).
Hippocampus fasciatus, *Kaup*.

Diagn.—The pedestal of the occipital coronet and the snout are short. The body has ten rings.

Descr.—This species is distinguished by the number of its body-rings. The nasal projection is more prominent than in *brevirostris* and *japonicus*. A small spine is situated before the larger orbital one. The body is likewise higher than that of *brevirostris*. The 2nd, 4th, 7th and 10th body-rings have more prominent knobs, while on the tail it is the 3rd, the 8th and the 12th which have the longer knobs. A blackish band crosses the 7th and 8th body-rings, and there are 6 or 8 black cross-bands on the tail. The dorsal fin, less high than that of *brevirostris*, equals in height the length of the space between the fore border of the orbit and the end of the snout.

I know only one specimen, which is a female, and measures 2¼ inches from the coronet to the point of the tail.

It inhabits the seas of Japan, and the Leyden Museum owes its specimen to Dr. Von Siebold.

4. Hippocampus Lichtensteinii, *Kp.*

Diagn.—The occipital coronet is a roundish elevated knob, with short spines before and behind. The short dorsal is placed on the last two body-rings.

Descr.—Of this species I know only three young females, which are in the Berlin Museum. It has a resemblance to *brevirostris*, but is easily distinguished by the diagnosis. The head, gill-plates, and under-piece of the snout are warty, and some warts exist on the sides of the body. The snout measured from

* This name was bestowed by Bleeker in honour of a young Dr. Mohnike.

the proximal border of the orbit is as long as the distance from thence to the extremity of the gill-plate. The body bulges at the 3rd, 6th and 10th rings. The tail exhibits from 6 to 10 lighter cross bars on a brownish ground.

It is not known from what country this very interesting species was sent to the Berlin Museum; but it probably comes from the Red Sea. The largest example measures rather less than 1½ inch in length.

5. Hippocampus guttulatus, *Cuv.*

Hippocampus guttulatus, *Cuv. R. A.* ii. 363.
Hippocampus antiquorum, *Leach, MS. B.M.*
Bloch, pl. 109. f. 3.

Diagn.—Nasal protuberance spinous. All the head-spines project forwards and are laterally compressed. The snout measured from the fore border of the orbit is as long as the distance from thence to the spine on the upper border of the gill-plate. A black band traverses the entire dorsal fin.

Descr. — The spines and knobs furnished with filaments, mostly simple, rarely forked. Some show whitish specks and cross lines on a dark ground, others are merely speckled, and some few have a clouded freckling between the more prominent body-rings. In some the dorsal fin is black, in others it has a black bar at the end only. In the Leyden collection I saw a full-grown female which had twelve body-rings and a longer snout; the supplementary ring being situated under the dorsal fin, which stands on the 3rd and 4th rings. In all other respects it agrees with other individuals, and cannot be considered as anything more than a highly interesting variety.

A female from the Mauritius belongs to the Berlin Museum. Five specimens from Gambia, received from Dr. Smith, exist in the British Museum, and there is a great number in Paris, Leyden, and other collections. Though I have seen a vast number of examples, none of them had traces of the rostral filaments which characterize the next succeeding species.

The Berlin Museum possesses a female specimen from the Brazils, sent by M. Olfers. It exhibits no filaments on the spines of the head, the dorsal angles of the third ring stand near together, and the other knobs are less prominent than in other individuals of the same size. It appears therefore from these notices of habitats that this species is very widely spread through the world.

6. Hippocampus ramulosus, *Leach*.

Hippocampus ramulosus, *Leach*, *Zool. Misc.* i. 105. t. 47.
Lowe, *Fishes of Madeira*, 5. t. 2 ♀.

Diagn.—Almost all the spines and protuberances covered with ramified skinny filaments, the soft parts of the body being warty. Dorsal fin having a short black band, and a height equal to the length of the snout measured from the nasal projection.

Descr.—One of the handsomest and most interesting species, and nearly allied to the common *guttulatus* and *brevirostris*. It has a snout of medium length, a nasal projection, and a very high spine in front of the coronet. The fore part of the coronet itself is concave, with five tags; the crest of the occiput deeper lengthwise, and the spines more approximated to each other. Dorsal supported by 17 rays, and the tail formed of 33 rings. A discoloured female specimen has only simple filaments without ramifications. This belongs to the British Museum, together with two other females received from the Zoological Society. In the Paris Museum there are one male and two females, sent by M. Deshayes from Algiers. The female has its skinny flaps not so much developed as those represented in Lowe's figure above quoted, and its snout has only twice the length of the diameter of the eye: the spine before the coronet is not prominently evolved, and the coronet has an irregularly formed depression which is connected with the acutely ridged crest of the breast-ring. A black stripe traverses the dorsal, and the first ray of that fin is as long as the snout measured from the nasal protuberance. The skinny appendages are not developed.

Six young individuals from the Canaries exist in a dry state in the Paris Museum; in all of them the coronet is more or less irregular. Only one female among them shows ramified filaments. It is probable that the curious skinny appendages appertain to certain periods in the life of this fish. I believe, moreover, that Dr. Rüppell's *H. fuscus* and the *H. obscurus* of Hempr. and Ehrenberg, both in the Berlin Museum, belong to this species.

7. Hippocampus comes, *Cantor*.

Hippocampus comes, *Cantor*, *Mal. Fish*, p. 1371. t. 10. f. 2 (1849).
Hippocampus longirostris, *Mus. Lugd.*
Hippocampus kuda, *Bleeker*, *Bijdr. tot d. Ichth. van Singapore.*

Hippocampus tænioptera, *Bleeker, Bijdr. Ichth. Abol. Nat. T. N. Ind.* iii. 306.

Hippocampus moluccensis, *Ibid.* iii. 305.

Diagn.—Length of the snout from the proximal border of the orbit equal to the distance from thence to the gill-opening, or approaching thereto. No nasal protuberance, or merely a small one in the young. Coronet moderately stilted, and having from 4 to 6 prominent tips. Breast-ring destitute of a spine pointing backwards, or of one curved upwards.

Descr.—A widely diffused species, which inhabits the Japanese, Chinese, Indian and Australian seas. Great numbers of specimens exist in all the more important museums. When fully grown it is one of the largest species, as an example in the Paris Museum shows, and at an advanced period of life all the protuberances are very blunt. Dr. Cantor, a skilful and acute observer, found one female at Penang that measured 5 inches in length, and which had round knobs on the tips of the head-spines and on the various body-rings. This character is incidental, since I have seen an individual in which the beginnings merely of the knobs can be traced. It is always, therefore, a difficult task to construct a diagnostic character from the inspection of a solitary example of the species.

Dr. Bleeker, in the first instance, characterized three species from varieties of this one, but in his more recent labours he has corrected himself, and brings his *tænioptera* and *moluccensis* under *kuda*, which is moreover identical with *comes*.

In young individuals having a length of from 2 to 4 inches, the nasal projection is spinous; two spines also appear under the eye, and two on the under piece of the breast-ring. There is, indeed, such a varicty in these spines, that we may see in an individual a single spine on one side of the body corresponding to two on the other side. Moreover, the protuberances of the body-rings are not always constant in their distribution, and we may find them on the 1st or 2nd, 4th or 5th, 7th, 9th and 11th body-rings. On the tail it is on the 3rd, 5th or 6th, 8th, 9th or 10th, 12th, 13th, 14th, 15th, 16th or 17th that the protuberances occur.

In a female 2 inches long, the height of the 10th body-ring is equal to the length of the last five body-rings. In a male of 4 inches, the 10th ring is equal to the length of the last six body-rings. In another male the same 10th ring has a height equal to the last seven or eight body-rings. A male in the Paris Museum which came from the Isle of Bourbon is abnormal, 1st, in having a longer snout; 2nd, in having only ten body-rings; 3rd, in having a less prominent belly and somewhat less height.

In all other respects it resembles other individuals obtained in the same locality. We also find individuals of *H. guttulatus* with a larger snout and one more body-ring. I think, therefore, that a slightly longer snout, or a body somewhat higher or lower, or furnished with one ring more or one less, are not sufficient of themselves for the separation of species. By attending to such signs, we should be obliged to divide the *H. abdominalis* of Lesson into many species.

In the Leyden collection there are five examples from Timor and Sumatra which have rows of white spots on the gill-plates; the body being brown or black with white points. Individuals in the collections of Paris, Leyden and Vienna exhibit black marbled speckling on the 1st, 4th, 5th, 7th and 8th body-rings and on the base of the back fin.

In some the skin is dark brown or black, ornamented with a white network; in others the colour is paler, and each ring has a black speck on its dorsal angle. In a female specimen collected by Quoy and Gaimard, cutaneous appendages exist on the spines of the back and tail; others exhibit small warts on the middle dorsal line.

On a comparison of all the Indian species, viz. *H. japonicus*, *H. Monikei*, *H. comes*, *H. mannulus*, *H. coronatus* and *H. histrix* with one another, this one was easily distinguished from *japonicus* or *Monikei* by its greater size, since none of them exceed the smaller individuals of *brevirostris*. From *mannulus* it may be discriminated by the want of the incurved spur-like spines of the breast-ring. *Coronatus* is known by its coronet being raised on a high pedestal, and *histrix* by its long, thin, sharp-pointed spines.

Though no difficulty occurs in distinguishing *H. comes* from the other Indian species, it is hardly to be recognized as separate from the South American *H. longirostris*.

8. Hippocampus longirostris, *Cuv.*

Hippocampus longirostris, *Cuv. R. A.* ii. 363.

Diagn.—The coronet set with blunt tubercles, of which the foremost is connected with the basal piece of the occiput. The upper orbital spine short and two-cornered.

Descr.—Length of the snout from the proximal border of the orbit as great as the distance from thence to the edge of the breast-ring. In the young there is a nasal projection which disappears with age. The spines on all the rings also are prominent in the young, and become blunt in the old. The species

is nearly allied to *H. comes*, but *comes* has a longer snout and larger spines on the head and body when young. It has also a resemblance to *H. moluccensis*, but the soft parts of the body and tail are furnished with small warts, and the snout is proportionally somewhat longer; the coronal pedestal is a little shorter, and the tips of the coronet less projecting. Much variety occurs in this species also. A male sent to the Paris Museum from Martinique by M. Richard, is yellowish-brown with dark brown specks encircled by small white warts. A dark brown spot on each ring forms a row along the lateral line. This individual measures 5¾ inches in length, and its height at the 10th ring is equal to the length of the last six body-rings. A female from the same island is discoloured by maceration in alcohol, but still retains traces of irregular clouded transverse bars: one of them on the 7th and 8th ring, another near the dorsal fin, and a third on the 5th and 6th tail-ring. Another individual from the same quarter, sent by M. Plée, is dark greenish-brown with black specks, and marbled markings on the 1st, 4th, 7th and 8th body-rings. A female sent from St. Lucie by M. Bonnesart is besprinkled with dark round spots, encircled by fine white dots; some irregular cross bands on the body and tail. On the end of the upper border of the orbit there is a small protuberance. This one is nearly 5 inches long, and is 0·71 inch high at the 7th ring, where the height equals the length of the last four body-rings, as in the female from Martinique.

9. Hippocampus bicuspis, *Kp.*

Diagn.—The spine that precedes the coronet and the one over the nostril forked.

Descr.—I am acquainted with only a very young female specimen, which was sent from Goree to the Paris Museum by M. Rang. It has 11 body-rings, of which the 1st, 4th, 7th and 11th have the bigger spines and projections. Three rings support the yellowish back fin. The body is very slender, and at its greatest breadth does not exceed in width the length of the last four body-rings. Two traces of dark cross bars upon the snout. Colour yellowish-brown, darker on the back and tail.

10. Hippocampus algiricus, *Kp.*

Diagn.—Snout equal in length to the distance between the fore-border of the orbit and the edge of the breast-ring. In females the 7th and 10th body-rings measure as much in

height as the last five body-rings do in length. Only one ring of the body assists in supporting the dorsal fin. The soft parts of the body show rows of light-coloured specks on a dark ground.

Descr.—A dried female specimen, sent from Algiers by M. Guichot to the Paris Museum under the appellation of *H. longirostris*, has much likeness to that species, as well as to *H. punctulatus*. The distinctive character of the latter consists in the 7th and 10th body-rings being the highest, and in the dorsal fin standing on three rings, of which one only is caudal. *H. longirostris*, on the other hand, may be discriminated by the 8th ring in the females, which is the highest, being as high as the last five body-rings are long. Its soft skin has, moreover, little warts which are wanting in *H. algiricus*. The Parisian specimen of *H. algiricus* is almost 5 inches long.

11. Hippocampus punctulatus, *Kp.*

Diagn.—Length of the snout equal to the distance between the front of the orbit and the edge of the breast-ring. In the female it is the 8th body-ring which is as high as the last six body-rings are long. Two of the rings on which the dorsal stands, belong to the tail.

Descr. — Of this species I know only a solitary example, which belongs to the Leyden Museum, and is a female. It bears much resemblance to *H. longirostris*, but is distinguished from it, 1st, by a shorter snout; 2nd, by the head being at the lower spine of the breast-ring somewhat higher, and by the outline of the breast and belly being more protuberant. In females of *H. longirostris* these parts are more nearly equal in height, and the 7th and 10th rings are almost of the same altitude. The soft parts are blackish-brown dotted with white; the gill-plates have black specks and stripes of white points.

12. Hippocampus mannulus, *Cantor.*

Hippocampus mannulus, *Cantor, Malay Fishes*, p. 1370. t. 11. f. 1 (♀).

Diagn.—The snout equal in length to the space between the front of the orbit and the edge of the gill-plate. The spines on the upper rim of the orbit and the one on the lower piece of the breast-ring, sharp-pointed and recurved. Dorsal fin as long as the snout.

Descr.—Dr. Cantor obtained two specimens from Penang. It is a very common species in China, whence examples have been sent to the Museums of London, Paris, Vienna, and Leyden. A female preserved in the French Museum in spirits was procured at Macao on the voyage of the Bonite. Out of the great number of individuals of this species which I have examined, not one of them had attained the size of *H. longirostris*. The biggest measured scarcely $6\frac{1}{4}$ inches.

The snout is pretty long. The edges of the orbits are confluent over the nostrils without forming a distinct projection. A regularly formed coronet, scarcely separated from the occiput, shows five or six spinules. From the coronet to the curved pectoral spine, the height is as great as the snout is long, measuring from between the eyes. A pale yellow ground-colour shows traces of broad bands on the body and tail. Some have on the 2nd, 4th and 7th body-rings, near their dorsal border, three pairs of black round spots (*H. sexmaculatus*, Schlegel, Leyden). Others have circles round the eyes of black specks, and a black stripe descending from the orbital spine through the eye; the membranous angle of the belly is black. In the Museums of London, Paris, Leyden, Vienna, Darmstadt, &c.

13. Hippocampus marginalis, *Heck.*

Diagn.—Dorsal fin standing on the last three of the twelve body-rings.

Descr. — This species is allied to *H. fasciculatis*, but the diagnostic character distinguishes it. It has a somewhat shorter snout than *H. fasciculatis*. White spots besprinkle the head and snout, and the gill-plates are crossed by curved black lines. Longitudinal black stripes run on the body to the 7th ring, and black cross lines succeed them from the 8th to the 12th rings. Irregular interrupted black lines traverse the belly lengthwise. The height of the body where greatest is equal to the distance between the coronet and the end of the snout. All the angles of the rings are more developed and prominent than in *H. longirostris*.

A single female Mexican specimen, deposited in the Vienna Museum, is the only example known to me.

14. Hippocampus fascicularis, *Heck.*

Diagn.—A snout longer than that of *H. brevirostris*, with more acute nasal projections; and the dorsal not standing on so high an elevation.

Descr.—Colour black, with very many white points. Gill-plates striped by 10 or 11 rows of white dots, and between the lateral line and the rim of the belly there are irregular white bands extending as far as to the 7th ring. From the 8th ring to the anus there is between each pair of rings a dark cross line sprinkled with white specks, and marbled.

The Vienna Museum possesses a male specimen from Mexico.

15. Hippocampus lævicaudatus, *Heck.*

Diagn.—The dorsal as long as the head, and standing on 5 rings. Body-rings 11.

Descr. — Allied to *H. brevirostris*. The eyes nearly in the middle between the end of the snout and the gill-opening. Up to the dorsal fin there are 8 rings. Tail without knobs, and the gill-plate silvery.

At Vienna there is a specimen from North America.

16. Hippocampus coronatus, *Temm. et Schl.*

Hippocampus coronatus, *Temm. et Schl. Fauna Jap.* p. 274. pl. 120. f. 8.

Diagn.—Pedestal of the irregular coronet very tall. Height of the head nearly as great as its length. Ten body-rings.

Descr. — This species is isolated by its stilted coronal pedestal, and is one of the finest discoveries made by the Dutch naturalists in Japan. Its size is from 4 to 5 inches. The two hinder tips of the coronet are the most developed. The young have more prominent spines than the old ones, but the pedestal of the coronet is not so high. On the rim of the orbit in the region of the nostrils and round the breast-ring the spines are longer and more pointed; the 2nd, 4th and 10th rings are gibbous along the back, as are also the 3rd, 9th, 13th and 18th tail-rings. In the female the 9th body-ring is as high as the last four body-rings are long. Colour yellowish, marbled with dark brown and edged on the back with black.

It is only in the Leyden collection that I have met with this species, which is pretty common in Japan and perhaps in China.

17. Hippocampus histrix, *Kp.*

Diagn.—The thin, elongated snout, much longer than the head; a long spine over the nostril, and all the spines unwontedly developed and pointed except on the end of the tail.

Descr.—This species is still more than the last one distinguished from all its fellows, its peculiar characters being its elongated snout and projecting spines. In the Paris Museum there is a male, but its egg-pouches are not much developed. The median ventral line is acute-edged like a knife, and sharply emarginated between the rings. A female in the Leyden Museum is larger, and, like the males, has longer spines on the 1st, 4th, 7th and 11th body-rings, and on the 2nd, 4th, 6th, 9th and 11th tail-rings. This one is from Japan. Its colour is uniform whitish-yellow. In neither individual are all the fins preserved entire. Japan.

18. Hippocampus abdominalis, *Less.*

Hippocampus abdominalis, *Lesson, Férussac, Bull. de Sc.* xi. 127.

Diagn.—Body of 12 rings, rarely of 13. The irregularly speckled dorsal of from 24 to 26 rays, standing on 5 or 6 rings. Belly very protuberant, having a height equal to the length of the last 8 or 9 body-rings.

Descr.—This fish departs from the general form of the genus, no less than the preceding two, in having an acute-edged, very prominent belly, and is a very distinct species, common in Australia. It is often thrice as high as it is broad. Its short snout is as long as the distance between the fore-border of the orbits to the spine of the gill-plate. In a male, whose head is figured, all the spines and protuberances on the body are blunt. Forty-seven tail-rings. The filamentous appendages on the head are simple, or branched like a stag's horn, or altogether wanting.

Colour yellowish, with black specks and stripes on the head. Upon the ribs the skin is yellowish, and between them blackish-brown or yellowish speckled with black. Tail barred across with yellow. Egg-pouch short, and extending merely to the 5th or 7th tail-ring. A male brought from the west coast of Africa is black, and there are also black varieties from Australia.

The British Museum possesses twenty-one specimens, presented by Sir John Richardson, Dr. Hooker, and Mr. Gunn. There are also very many in the Paris Museum, obtained by M. Verreaux on the voyage of the Zelée, &c.

Genus 2. ACENTRONURA, *Kp.*

Diagn.—The edge of the back coincides with the upper tail-ridge, forming one and the same line. Gill-opening situated at the point of the occiput. No protuberances either on the body or tail.

Descr.—No coronet, merely a sharpening of the occipital bone, as in the hind-head. Borders of the orbits like the breast-ring destitute of spines. Dorsal fin standing on an insignificant eminence. Tail furnished with an egg-pouch, as in *Hippocampus.*

1. Acentronura gracillima, *Kp.*

Hippocampus gracillimus, *Fauna Jap.* p. 274. t. 120. f.

Descr.—Its length is about 3 inches. The head does not exceed the body in height, and the tail is twice as long as the distance from the anus to the breast-fin. The speckled back-fin of 17 rays is sustained by four rings, two of them belonging to the tail. In the tail the rings number from 42 to 45. Anal scarcely observable. In the prevailing yellowish colour there are traces of dark and dotted cross bars.

In the Leyden Museum there are four females full of eggs, and two males.

Genus 3. GASTEROTOKEUS, *Heck.*

Syngnathoides, *Bleeker.*
Solegnathus, *Bleeker*, nec *Swainson.*

Diagn.—Edges of the expanded belly formed by the lateral lines. No nuchal shield. Tail prehensile. Dorsal standing in a furrow on from 10 to 11 tail-rings.

Descr.—Compressed snout longer than the head, shagreened by deeply-cut lines and pits. Forehead concave. Upper border of the orbit ending in a spinous point. Occiput somewhat round, elevated, destitute of a coronet. The gill-opening situated next to the back piece, and furnished with a half ring of bone. In the place usually occupied by the nuchal shield there is a breadth of naked skin, covering the neck-sinews that sustain the head in its nodding movements. Ventral surface of the breast-ring concave in the middle, notched at the point, and heightened on both sides at the attachments of the pectorals.

The space under the rim of the belly (lateral line), wherein the true angle of the belly would be, and the median ventral line lie in one and the same plane.

The males, like those of *Nerophis*, carry their eggs in 6 to 8 rows extending from the anus to the 2nd body-ring.

1. Gasterotokeus biaculeatus, *Heck.*

Syngnathus biaculeatus, *Bloch*, t. 121. f. 1.
Syngnathus Blochii, *Bleeker*.

Descr.—It attains a length of 6¾ inches and perhaps more. Body composed of 16, and tail of from 20 to 25 determinate rings; the others, 23 to 28, are to be reckoned in dried specimens only. The tail, as far as the end of the lateral projection, is hexagonal. Dorsal fin standing on 10 to 11 rings, the first of which is the anal ring. A wreath of fine warts surrounds the anus. Some individuals exhibit cutaneous flaps on the snout, and throughout the body. The anal fin lies in a cavity. In the Berlin Museum there is a male variety which has a projection over the nostrils. The colour is rosaceous violet, marbled with yellow and green, and striped. Snout and fins rose-coloured. Others are more generally yellowish-brown.

Very common in the Chinese and Indian Oceans, the Indian Archipelago, Red Sea, Madagascar, &c. Numbers of specimens are kept in all the Museums of Leyden, London, Paris, Vienna, Berlin, &c.

Obs. — We are ignorant of the manner in which the eggs are hatched in the two following genera, since no specimens have been procured which possess egg-pits on the breast and belly or have tail-pouches. It is probable, therefore, that the eggs are matured in these genera as in ordinary fishes.

Genus 4. SOLENOGNATHUS, *Swainson*.

Solenognathus, *Swainson, Nat. Hist. of Fishes*, ii. 333.

Diagn.—Body laterally compressed and higher than broad. Lateral line confluent with the upper angle of the tail, forming an arch. The intermediate, oblong, little shields are radiated by lines in relief. From 22 to 26 body-rings, and 55 to 60 tail-rings. Dorsal fin standing in a furrow on 10 to 11 tail-rings. Tail prehensile.

Descr.—Snout longer than the head, with rough edges. Margins of the orbits on the fore and under side, and as far forward as the nostrils, furnished with rough, irregular, short spines. Hind-head destitute of a coronet, but with a spine and an elevated nuchal shield, on which there are lines in relief. Breast-ring acutely ridged on its dorsal surface, with a spinous projection laterally, and a median furrow on the ventral surface; above as well as below it has two pairs of spines. Pectoral fin broad, but not long. Back concave, with bunchy intermediate scales. Belly sharply ridged.

1. Solenognathus Hardwickii, *Swains.*

Solenognathus Hardwickii, *Swainson, Nat. Hist.*
Syngnathus Hardwickii, *Gray, Ill. Ind. Zool.* pl. 89.
Hippocampus Hardwickii, *Voigt, in der Ubersetz. von Cuv. Règne Anim.*
Solegnathus polyprion *, *Bleeker, Bijdrag. d. Troskieuwige Visschen v. d. Ind. Archip.* xxv. *deel d. Verh. Batav. Gen.* p. 25.

Descr. — This is the longest, thickest, and most rugged form of the whole family, and exhibits the greatest number of body-rings. The tail-rings are from 55 to 60. In some individuals there are skinny appendages to the snout. The colour is yellowish-brown, with blackish edges to the back. Eyes golden, with black streaks. *Rad.* P. 23; D. 43; A. 4; C. 0.

It is a common species in the Indian Ocean, especially in the China Sea. Dimensions of very large individuals: whole length from 15¾ to 17¾ inches; length of head, 2 to 2·3 inches; distance from the edge of the gill-plate to the anus, 6·6 to 7·5 inches; length of dorsal fin from 1·9 to 2·3 inches.

Genus 5. PHYLLOPTERYX, *Swainson.*

Phyllopteryx, *Swainson, Nat. Hist. of Fishes,* ii. p. 332.

Diagn.—Body much compressed; neck elongated, slender; back arched; belly prominent; and dorsal fin standing on an elevation. Flat, denticulated bones, supporting leaf-like cutaneous appendages, project from the body and tail. Tail destitute of a fin, yet not prehensile.

* I cannot distinguish between *S. polyprion* from China and *S. Hardwickii* from India.

Descr. — Snout twice the length of the head, with two spines on its posterior third part. Two diverging spines on the upper rim of the orbit. Body compressed, with a thin belly and back. The lateral line united to the under angle of the tail. The upper angle of the tail extends forwards to the beginning of the dorsal fin. All the angles rough and emit a spine at the extremity of each ring. A thin, elongated spine on the hind-head and breast-ring. Denticulated bony projections springing from the ventral aspects of the 8th and 10th body-rings; likewise from the dorsal aspects of the 11th and the ultimate body-rings, and from the 10th, 16th, 21st and 25th tail-rings. All these projections are adorned with leaf-like appendages. The breast-ring, which is swollen out, has four pairs of spines.

This genus comes nearer to *Solenognathus* and *Hippocampus* than to *Gasterotokeus*.

1. Phyllopteryx foliatus, *Swainson*.

Syngnathus foliatus, *Shaw*, *Gen. Zool.* v. 180.
Syngnathus tæniopterus, *Lacép. Ann. du Mus.* iv. t. 58. f. 3.

Descr.—This is one of the most extraordinary forms among fishes. I am acquainted only with the grown-up fish, and have seen none of the young of this species. Full-grown individuals have a length of upwards of 15·8 inches. Round light-coloured specks exist on the head and snout, and also on the body and tail. Five white stripes run down the elongated neck. Dr. Brown, the celebrated botanist, possesses an admirably coloured figure of this species, executed by Bauer during Capt. Flinders' survey of the coasts of Australia. The body has 17 rings, and the tail about 25. The dorsal fin stands on 7 rings, of which one only belongs to the body. *Rad.* P. 20; D. 30; A. ? 4; C. 0. The leaf-like membranes are black or brown, with deep black borders.

Lacépède's figure is incorrect, and represents the snout as too short. None of the examples in the Paris Museum have so short a snout, and I can scarcely think that it represents a distinct species. Shaw's and Lacépède's names were published in the same year.

Specimens exist only in the British and Parisian Museums.

Subfam. 2. SYNGNATHINÆ, *Kp.*

Males furnished with a caudal egg-pouch, which is open throughout. Tail never prehensile.

Genus 1. HALICAMPUS, *Kp.*

Diagn.—Snout thin and short, set with three rows of small spines, and distinctly separated from the high forehead and elevated and spinous borders of the orbits. Eyes projecting. Hind-head, nape, and breast-shield furnished with a rough, elevated, comb-like crest. Breast-ring broader at the pectoral fins than the body. Dorsal fin standing on an elevation formed by three rings only. Borders of the body rough, and furnished with various cutaneous filaments.

This genus is the representative in its own subfamily of the genus *Hippocampus*, and is allied to the genera *Corythoichthys* and *Trachyrhamphus*.

1. Halicampus conspicillatus, *Kp.*

Syngnathus conspicillatus, *Jenyns, Voy. of Beagle*, p. 147. pl. 27. f. 4.
Halicampus Grayi, *Kp. British Museum.*

Descr.—Snout measured from the orbits as long as the distance from thence to the edge of the operculum. Operculum small, and divided into two dissimilar parts by a denticulated line standing out in relief; the broader under part being scarred, and varied by from 8 to 9 prominent curved lines. A trace of a cutaneous filament exists on the rough rim of the orbit; and in the rough, concave forehead there are two lines in relief, which are confluent above the nostrils; there being in the middle also a spiny crest. Posteriorly the breast-ring falls abruptly away and rises again near the pectoral fin in a pyramidal form. Gill-opening situated very high up. There are 15 body-rings before the dorsal fin, and 17 before the vent. They are made rough by prominent lines, short projections, and rugged marginal bunches. Warts exist on the small intermediate dorsal scales of the body and tail, and occasionally serve as roots of cutaneous filaments. Three rings, one of them only belonging to the tail, sustain the dorsal fin. Each tail-ring has a small spinous projection on its under edge, that resists the finger when drawn along it. The tail, which is slightly longer than the body, is composed of from 32 to 37 rings. In the male specimen preserved in the British Museum there are dark brown scales projecting over the egg-pouch, and every ring is notched. The head is brown, with two white specks or stripes on the gill-cover, one black speck near the pectoral fin, and another close to the dorsal fin. The fins are bluish and translucent, and the base of the dorsal is black.

The solitary specimen in the British Museum came from India. A female in the Paris Museum was obtained by M. Busseuil on the coasts of New Holland, during Bougainville's Expedition. It is rougher and darker coloured. The one described by Jenyns, in the 'Voyage of the Beagle,' is slightly speckled on the dorsal. His example from Tahiti differs in the numbers of its rays, as shown below:—

Radii.—P. 17; D. 31; A.? 3; C. 10, Jenyns.
P. 18; D. 21; A.? 2; C. 10, Kaup.

	Dimensions of the ♂	♀
Length of the head	0·6 in.	0·6 in.
From tip of snout to anus	2·3 „	2·2 „
Length of the tail	3·6 „	3·0 „

Genus 2. TRACHYRHAMPHUS, *Kp.*

Diagn.—The three species of this genus hitherto discovered resemble *Halicampus*; but the head is longer, and the snout is denticulated on its dorsal aspect only, and is not so distinct from the head. Five or six rings, three of which appertain to the body, support the elevated base of the dorsal fin. The breast-ring is no wider than the head. All the species are still more elongated in form than *Halicampus*.

1. Trachyrhamphus serratus, *Kp.*

Syngnathus serratus, *Temm. et Schl. F. Jap.* t. 120. f. 4.
Russel, t. 130.
Typhlus rostro cristato-serrato, *Par. Mus.*

Diagn.—Snout arched, shorter than the space intervening between the proximal corner of the eye and the extreme edge of the gill-cover.

Descr.—This species, allied nearer to the following than to the preceding one, has a more elongated form and less elevated superciliary ridges, combined with more out-springing orbits. It has the dorsal aspect of the head more even, and more feebly shagreened, and its operculum is marked by fine streaks proceeding from a prominent line. The snout has a spiny crest on its dorsal aspect only. There are 21 body-rings and 78 rings in the tail. The dorsal fin stands on 5 rings, three of them belonging to the body. On its ventral aspect the breast-ring is com-

posed of eight shields, and on its dorsal aspect it is furnished with a denticulated crest. The colour is greyish-brown, with two pairs of black specks on the under piece of the snout. The eyes, and lower part of the gill-cover, and sometimes the whole operculum, are silvery.

A male 10 inches long has an egg-pouch 3·35 inches in length; and a very long female measures 3·86 inches along the body, and 6·58 inches along the tail.

Specimens brought from China and Japan by Dr. Siebold are preserved in the Museums of Leyden and London. A female specimen in the Paris Museum was obtained at Macao by M. Eydoux (*Voy. de la Bonite*).

Rad.—P. 18; D. 20; A. 3; C. 9.

2. Trachyrhamphus longirostris, *Kp.*

Diagn.—The space intervening between the fore angle of the orbits and the furthest edge of the gill-cover is shorter than the length of the recurved snout.

Descr.—This species resembles the preceding one, but has a longer snout and tail. There are 27 body-rings and 53 tail-rings, and the breast is conspicuous by its prominence between the 5th and 9th rings.

Rad.—P. 18; D. 27; A. 3; C. 9.

Colour like that of the first species. An old male 12·5 inches long measures on the body 4·4 inches; along the tail 8·0 inches; and has an egg-pouch 2·8 inches long. The British Museum possesses two specimens that were captured by Captain Sir Edward Belcher.

3. Trachyrhamphus intermedius, *Kp.*

Diagn.—The straight, thin snout equal in length to the distance between the fore angle of the eye and the extreme edge of the gill-cover.

Descr.—Snout longer than that of *serratus*, but shorter than that of *longirostris*. Two lines proceeding from the proximal part of the orbit form a spinous projection over the nostril; the remainder of the crest is merely acutely ridged. Nineteen rings precede the dorsal fin, and there are 21 before the anus. The dorsal stands upon six rings. The Paris Museum contains a damaged specimen. Its country is China? or Japan.

Genus 3. CORYTHÖICHTHYS, *Kp.*

Diagn.—Body tolerably long, but the fins not much developed, the tail-fin especially being diminutive. Snout half the length of the head, which is elevated, rising from the large orbits. The dorsal fin commences in the concavity of the tail over the anus, and is not placed on an elevation as in *Hippocampus* or *Trachyrhynchus*; but the projecting edge of the caudal border next the dorsal fin renders the breadth of the fish there greater than elsewhere. Light cross-bars vary the body.

1. Corythöichthys albirostris, *Heckel.*

Diagn.—Rostral crest medial and interrupted. Body-rings 12, tail-rings 29; dorsal fin standing on 5 rings, four of which belong to the tail.

Descr.—Snout half the length of the distance between the fore border of the orbit and the base of the pectoral fin. Colour yellowish-brown, with 14 blackish cross-bars. Lower part of the gill-cover brown with blue stripes.

Rad.—P. 12; D. 27; A. 2 or 3; C. 10.

Length of the body 2·67 inches, of the tail 3·30 inches, of the dorsal fin 0·6 inch.

Mexico, Bahia. One female specimen exists in the Vienna Museum; and the Museum of Stuttgard contains a male and female procured by M. Blanschet. This pair are speckled with dusky and light colours, and dotted with white. The small intermediate scales are bordered with white, and all the three examples have a white snout.

2. Corythöichthys fasciatus, *Gray.*

Syngnathus fasciatus, *Gray, Ind. Zool.* 89. f. 2.
Syngnathus hæmatopterus, *Bleeker, Descr. Pisc.* p. 34.
Syngnathus pictus, *Hempr. & Ehrenb.* (*Berl. & Paris Mus.*)

Diagn.—Gill-cover divided into two dissimilar parts. Dorsal fin standing on 5 rings, all of them belonging to the tail. Back concave, with sharp borders, which form a projecting spine on each ring. Belly broad and round, with a medial longitudinal keel. There are 17 rings before the dorsal fin, and 35 rings in the tail. The lateral line is straight and interrupted.

Descr.—One of the handsomest species of the genus, resembling *albirostris* in its large eyes and snipe-like snout, which is furnished with a small and finely denticulated medial crest. Head oval, descending suddenly from the forehead to the snout, whose length equals the space between the fore angle of the eye and the distal border of the gill-cover. A line rising in relief extends from the nostrils behind the orbits and on to the occiput. An interrupted, diaphanous, arched crest runs over the hind-head, nape and breast-ring. In the males the site of the egg-pouch is not deeply excavated, being merely flatly concave, and the lateral membranes are too scanty to cover the eggs.

Colour brown, with dark cross-bars. Gill-cover yellow, with blue and black stripes. The young have two longitudinal stripes on the gill-cover, the upper one passing through the eye. On the hind-head there is a blacker, changeable speck, and the ventral surface between the two gill-covers is black. Breast-ring black, with a white girdle. The black dorsal cross-bars are often reduced to slender lines resembling Arabic characters. On the sides there is a light-coloured speckling on a reddish ground-colour. According to Bleeker, a young female specimen from Trincomalee has a gold-coloured gill-cover. The dorsal aspect is green, the ventral one yellow, and the fins red. A large female example preserved in the Parisian Museum under the name of *Typhlus Desjardini*, and received from the Isle of Bourbon, is yellowish-brown, with traces of markings.

Rad.—P. 16; D. 29; A. 4; C. 10.

Amboyna, Bourbon, Ceram, Celebes, China, Noukahiva, and the Red Sea. Presented by Forster, Sir John Richardson, Reynaud, Hemprich and Ehrenberg to the Museums of London, France, Leyden and Berlin.

3. Corythoichthys vittatus, *Kp.*

Diagn.—Brown; the body and tail crossed by 27 white bars.

Descr.—The Paris Museum possesses a female specimen, brought from the Brazils by De Lalande. It is more closely related to *albirostris* than to *fasciatus*. Snout short and high, half the length of the head, with an irregular, denticulated crest on its dorsal aspect originating between the orbits, but not reaching to its tip. From the under margin of the orbit a furrow extends obliquely to the tip of the snout. There are 16 body-rings before the dorsal fin, and 17 before the anus; and the dorsal is supported by 5 rings, of which four belong to the tail. On the last body-ring the lateral line coalesces with the under angle of the tail; and the upper angle of the tail extends

forwards to the beginning of the dorsal. There are in all 37 tail-rings.

Rad.—D. 20; A. 3; C. 8.

Under piece of the snout yellowish, with three brown specks. A whitish cross-bar on the occiput. The ground-colour is dark brown, with 27 nearly complete cross-bars.

Entire length of the fish 5·24 inches. Length of head 0·44 inch. Length of tail 3·23 inches. Length of dorsal fin 0·47 inch; and height of the last body-ring 0·20 inch.

4. Corythöichthys gastrotænia, *Kp.*

Corythöichthys fasciolatus, *Kaup, Paris Mus.*
Syngnathus gastrotænia, *Bleeker, Bijdr.* p. 22 (1853).

Diagn.—Snout crestless, but furnished with irregular rows of small spines.

Descr.—I have seen only a female example, which the Paris Museum received from Leyden, under the name of *Syngn. micrognathus*, Kuhl et V. Hasselt. Under the same appellation I have received three specimens from Leyden, which belong to a totally distinct genus*.

The short, thick, irregular snout, spinous on its dorsal aspect, is one-third of the length of the head. Eyes large, and the very rough-bordered orbits rise suddenly and are closely pressed together so that the forehead is very narrow. Occipital crest sharply ridged and toothed. A line standing out in relief extends from the orbits to the occiput. Gill-cover roundish, bulging, rough, and divided into two dissimilar parts by a prominent line. A toothed crest on the nape and breast-shield. Between the breast-ring and the dorsal fin there are 14 rings, or 15 if the anal ring be added. The dorsal is supported by 7 rings. The tail, which is not quite the length of the body, has 40 rings. The lateral line reaches to the anal ring, and the upper angular edge of the tail is continued from the termination of the lateral line to the first ring of the dorsal.

Rad.—P. 17; D. 29; A. ?; C. 10.

Colour of the snout, gill-cover, forehead, occiput, and nostrils

* The *Syngn. micrognathus* of the Leyden Museum, represented by these three specimens, is one with the *S. compressus* of Kuhl and Van Hasselt; and the manuscript name of *Typhlus Goudoti* of Bibron is a synonym thereof. This latter I prefer for the specific designation. Vide *Hemithylacum Goudoti.*

dark brown with whitish bars. Body brown, with a yellowish-brown cross-bar and speckling on each ring.

Found at Wahai and Ceram in the North Pacific.

5. Corythöichthys brevirostris, *Kp.*

Syngnathus brevirostris, *Rüpp. Neue Wirbelth.*

Diagn.—Merely a trace of a cranial crest, and no rostral spines. Lateral line connected in an arch with the under angle of the tail. Body-rings 14–15; tail-rings 30; dorsal standing on 5 rings, the first one being the anal ring.

Descr.—This is the most diminutive member of the subfamily. A male example, belonging to the Frankfort Museum, having an egg-pouch, is pale yellowish, with five rows of specks on the margin of the body. Another male exhibits yellowish specks or bars on the back circumscribed by black borders. The angles bordering the ventral surface of each ring show a row of lighter points. The eyes are silvery, with black points on the iris, or this is wholly black. A small female is striped with white, and its dark back has three yellowish cross-bars.

Rad.—P. 12; D. 12; A. 3; C. 10.

Length of the head 0·22 inch, of the snout 0·10 inch, of the body 0·70 inch, of the tail 1·06 to 1·18 inch; of the egg-pouch 0·39 inch.

Discovered in the Red Sea by Dr. Rüppell. Preserved in the Museums of Frankfort, London, Stuttgard, Berlin, and Darmstadt.

I hold the following species, known to me through Bleeker's Monograph of the Indian Syngnathidæ, to be new, and to belong to *Corythöichthys.*

6. Corythöichthys dactyliopherus, *Kp.*

Syngnathus dactyliopherus, *Bleeker, Diagn. nieuw Vissch. Bat. Nat. T. N. Ind.* deel iv. p. 506; *Bijdr. tot de kenn. Trosk. Vissch.* p. 16.

Diagn.—Tail, excluding its fin, much shorter than the body without the head. Dorsal commencing immediately above the anus, or scarcely perceptibly before it. The keels forming spines on each ring directed backwards. D. 26 rays. Body-rings 18. Caudal rings 20. Tail, without the fin,

more than twice as short as the head and body together. Body encircled by yellow and violet-brown rings.

Descr. — Body very long, cylindrico-heptagonal anteriorly, tetragonal posteriorly, and having a breadth equal to its height, or to the 30th or 31st part of its length. Head measuring about one-fifth of the length of the body, while the diameter of the eye is about the 8th or 8·5th part of the length of the head. The rostro-frontal profile is concave before the eyes; and the snout is about thrice as long as the post-ocular part of the head; it is compressed, and seven or eight times larger than its slenderest part is high. Forehead and convex crown of the head granular; no medial post-ocular crests. A short crest on each side of the snout, and together with the orbits slightly denticulated. Gill-cover granular, the grains being disposed somewhat in rows. Body-rings 18, tail-rings 20, the individual rings slightly granular; the interstitial plates small, oval, and also slightly granular; the keels of the several rings very low, but emitting a very conspicuous little spine pointing backwards from each ring. The small spines of the medial ventral keel are shorter than those of the other keels. The tail, excluding its fin, is a little shorter than the trunk of the body, and twice as short as the trunk and head together. Dorsal fin commencing above the anus on the 18th body-ring, and ending on the 4th tail-ring. It is lower than the body: the anal is very diminutive, and the oblong obtuse caudal fin is about twice as long as the post-ocular portion of the head. Colour of the body beautifully yellow, encircled by 27 violet-brown rings broader than the intermediate spaces. On the snout there are 5 rings, one of them passing through the eyes, 2 between the eyes and the pectoral fin, and 9 between the pectoral and anal fins; while the remainder belong to the tail. The fins are rosaceous, the caudal alone being reddish-violet.

Rad.—D. 26; P. 21 or 22; A. 4; C. 9. Length of specimens 5·1 and 5·7 inches.

Found at Batavia in the sea near the Onrust Island.

Genus 4. ICHTHYOCAMPUS, *Kp.*

Diagn.—The edges of the concave back coalesce with those of the tail into one line, which runs without interruption to the caudal fin.

Descr.—Head short, with a shorter, compressed, sharp-ridged snout. Orbits slightly projecting. Operculum round, swollen, higher than broad, and grained like the head. Tail almost as

thick as the body, and suddenly pointed at the setting on of the very rudimentary caudal fin. Anus situated under the beginning of the dorsal fin. This genus approaches very nigh to *Corythöichthys*, but is distinguished from it by its more tetragonal form, and by the characters mentioned above in the diagnosis.

1. Ichthyocampus Belcheri, *Kp.* Pl. V. f. 39.

Diagn.—The very short snout constituting one-third of the entire length of the head. Tail a little longer than the body. The lateral line extending nearly three rings beyond the anus.

Descr.—An unwontedly short form in comparison with its thickness. Head oval, with a distinct crest on the dorsal aspect of the breast-rings, nuchal shields and occiput. A distinctly raised line running from the orbit to the occiput, and a notched crest passing from the forehead over the abbreviated snout. The under nostril shortly tubular. The bulging operculum lineated, and showing a trace of a curved longitudinal line, by which it is divided into two dissimilar portions. Body flat on the back, and rendered septangular by its lateral and ventral borders. Fifteen rings before the dorsal fin, and 16 up to the anus. The dorsal fin stands on 5 rings, the anal ring being the first of them. The lateral line reaches the 4th of these dorsal fin-rings.

Ground-colour yellowish- or blackish-brown. The lighter-coloured specimens have more numerous spots in rows, four or five dark cross-bars on the body, and five on the dorsal aspect of the tail. In the darker individuals the bands have lighter borders.

Rad.—P. 12; D. 22; A. 3; C. 10.

Length of snout 0·16 inch, of head 0·39 inch, of body 1·42 inch, of tail 2·05 inches, of dorsal fin 0·24 inch.

Specimens procured in China by Captain Sir Edward Belcher are deposited in the British Museum, and in the Leyden Museum there are others brought from Borneo by Dr. Müller.

2. Ichthyocampus carce, *Kp.*

Syngnathus carcè, *Ham. Gang. Fish*, p. 13.
Bleeker, Natez. op de Ichth. Fauna. v. Beng. und Hindost. p. 161.
Syngnathus platygnathus, *Kuhl & Van Hasselt, MSS.*

Diagn.—Snout half the length of the head. A continuous,

uncomplicated rostral crest, which does not reach to the mouth. Lateral line terminating upon the anal ring. Tail twice as long as the body.

Descr.—This species has a more elongated form than the preceding one. Vestiges only of lines in relief exist on the temples, occiput, nape, and on the dorsal aspect of the breast-rings. The broad, swollen gill-cover is striped, and has a prominent line anteriorly. There are 15 rings anterior to the dorsal fin, and 16 before the anus, as in *Ich. Belcheri*. The dorsal fin stands on 6 rings, the first of which is the anal ring. In the tail there are 36 or 37 rings in all, and 19 up to the end of the egg-pouch. The following are the dimensions of a male specimen sent by Kuhl and Van Hasselt to the Leyden Museum :— entire length 3·35 inches; length of head 0·39 inch, of body 1·22 inch, of tail 2·13 inches, of egg-pouch 1·03 inch.

Rad.—P. 12; D. 20*; A. 2; C. 10.

Dr. Hamilton describes the colours in the following words : — "The colour is greenish-brown, with some obscure pale transverse belts on the back, and ten or eleven spots on each side at the lower edge of the scales by which the joints are surrounded."

The species inhabits the Sea of Java, and specimens exist in the Leyden Museum.

3. Ichthyocampus ponticerianus, *Kp.*

Typhlus ponticerianus, *Bibron, Paris Mus.*
Syngnathus heptagonus†, *Bleeker.*
Hippichthys heptagonus, *Bleeker*, xxvste deel *der Verhand. van het Bat. Gen. van Kunsten en Wetensch. Bijdr. tot de Kennis d. Troskieuwige Visschen v. d. Ind. Arch.* p. 25.

Diagn.—A longitudinal row of white points on the rim of the belly. Belly arched and acutely keeled.

* Dr. Hamilton enumerates 25 rays in the dorsal, and informs us that the natives of India call it the "Crocodile's tooth-pick," or "tooth-cleaner." He also reckons the body-rings at 32, which is certainly an error, as such a number is not to be found in any species of the whole subfamily. He has apparently included the tail-rings in his enumeration of those of the body.

† Dr. Bleeker has constructed his genus *Hippichthys* on this species in the 22 *band Verh. Bat. Gen. Bijdr. Ichth. Mad.* p. 15, and in the 25 *band der Verh.* he renounces it. Since the name of *heptagonus* expresses a form common to almost all the *Syngnathidæ*, I have chosen the name of *ponticerianus*, previously employed in the Parisian Museum.

Descr.—Length of the snout equal to the distance between the hinder angle of the orbit and the further edge of the gill-cover. The head is shagreened or roughly streaked. The lateral lines coalesce with the angle of the tail in an arch. Number of the body-rings 15, of the tail-rings from 38 to 40. Dorsal fin situated on the second and following tail-rings to the 7th inclusive. Almost the entire side of the tail is covered by the intermediate rings, which are very high. The female has two rows of black spots on the yellowish under part of the snout.

Rad.—P. 17; D. 24; A. 2; C. 10.

Length of the head 0·39 to 0·46 inch; the body 1·02 to 1·14 inch; the tail 2·80 to 3·00 inches; and the egg-pouch 1·30 to 1·46 inch.

The Parisian Museum possesses three males and three females, sent from Pondicherry by Leschenault; the Leyden Museum one female, obtained at Macassar by M. Piller; and a pair from Assam, sent by Mr. Walker, are deposited in the Berlin Museum.

This species bears a resemblance to Dr. Rüppell's *spicifer*, and may easily be confounded with it, if the generic characters be overlooked. Dr. Bleeker mentions this resemblance. He found the dorsal placed on the 3rd to the 8th rings.

Genus 5. SYNGNATHUS *, *Linn.*

Diagn.—No spines on the straight outstretched cylindrical snout. Body heptagonal. The dorsal fin stands on a level with the back, not on an elevated base. The upper border of the back never runs into the same line with that of the tail; and the upper border of the tail is either coalescent with the lateral line, or is interrupted at the end of that line. Dorsal surface of the body flat or flatly concave, and never much compressed or bent into an arch. The number of the body-rings never amounts to 24 or 27. The species occur in every sea.

* Late authors, following Rafinesque, have placed the *Nerophes* that have a caudal fin in *Syngnathus*, but these cannot be separated from the *Nerophes* with finless tails. Bibron has named this genus *Typhlus* in the Paris Museum, but has included therein almost all my new genera of the *Syngnathinæ*, and even of the *Doryrhamphinæ*, so that I cannot employ his name.

A. *Species having a distinctly prominent line passing through the middle of the gill-cover.*

1. Syngnathus argyrostictus, *Kuhl et Van Hasselt.*

(Leyden Museum.)

Syngnathus djarong?, *Bleeker*?

Diagn.—Lateral line straight, interrupted, reaching to the anal ring. Back flat, sides compressed, and belly acute. The edge of the back reaching to the 5th ring of the dorsal fin, and the upper caudal edge terminating at the 2nd ring of the dorsal, which stands on five caudal rings. Body formed of 16 rings, and the tail of 40.

Descr.—This species comes near the *spicifer* of Rüppell, but the snout is longer and more slender; its length, measured from the front of the orbits, being equal to the distance from thence to the base of the pectoral fin. The rings are separated from one another, but without serrature. The tall, brownish dorsal fin is diaphanous, and the yellowish-brown body is bestrewed with white specks encircled by black. Tail-pouch dark brown. The short caudal fin has firm rays, and is of a black colour crossed by lighter bars.

A male measuring 5 inches in length has the head 0·71 inch long, the body 0·41 inch, the tail 2·98 inches, the egg-pouch 1·34 inch, and the dorsal fin 0·43 inch long.

Rad.—P. 16; D. 26 or 27; A. 2; C. 10.

Leyden Museum, from Java.

2. Syngnathus biserialis, *Gray.*

Descr.—Greatly resembles the foregoing species, but the snout is shorter, and measured from the middle of the orbit its length is equal to the distance from thence to the base of the pectoral. Body-rings 16; tail-rings 46.

Rad.—P. 16; D. 27; A. 3; C. 10.

Length of body 2·01 inches, of tail 2·96 inches, of dorsal fin 0·47 inch, of head 0·64 inch.

This species rests on a bleached Indian specimen in the British Museum, and I have not been able actually to compare it with *argyrostictus*; so that there is a probability of its being identical with that species.

3. Syngnathus spicifer, *Rüppell.*

Syngnathus spicifer, *Rüpp. Neue Wirbelth.*

Diagn.—The lateral line descends in a curve to the lower border of the first tail-ring. Base of the dorsal fin including the 2nd and 8th tail-rings. Back flat, belly acute; 15 rings before the anal one, and 16 before the dorsal. Edge of the back reaching to the fifth ring of the dorsal fin.

Descr.—A distinct and handsome species, discovered by Dr. Rüppell in the Red Sea. The Frankfort specimen is a male. At Leyden there is one female obtained at Macassar by M. Piller, and another got by Forster at Celebes. A dried specimen sent from Pondicherry by Leschenault, and two males and one female preserved in spirits, captured in the same sea by Reynaud, on the expedition of the 'Chevrette,' belong to the Paris Museum.

The snout, measured from the front of the orbit, is as long as the distance from thence to the root of the pectoral fin. Forehead somewhat concave, orbits moderately projecting. A line rising in relief between the orbits and the somewhat elevated hind-head, which also has a prominent medial but irregular line. Body higher than broad, with a sharp belly and very distinct edges. Tail of 39 or 40 rings.

Rad.—P. 14; D. 27; A. 2, very rudimentary; C. 10.

Length of head 0·73 inch, of snout 0·33 inch, of body 2·00 inches, of egg-pouch 1·81 inch.

Under part of the snout brownish, gill-cover whitish with black dots. Belly whitish, with 17 black cross-bands rising to the angle of the back. The short dorsal fin is speckled with black. The Macassar female has distinct markings. Another female 6·78 inches long, is almost black, with traces only of white spots; it was brought from Guinea, and is in the Leyden Museum. The dried Parisian specimen, which is from Pondicherry, has no distinct markings, nor any decided colour. It is evident, from the above remarks, that the species is very widely diffused in the ocean. Since the patterns of colours which it exhibits are not constant, I have drawn up the specific characters rather from peculiarities of form.

4. Syngnathus Kuhlii, *Kp.*

Syngnathus variegatus, *Kuhl et V. Hass.*

Diagn.—Lateral line descending in an arch to the lower border of the first tail-ring. Dorsal fin placed on five rings.

the first of which is the anal ring. There are 12 rings before the dorsal, and 13 if the anal ring be included. The upper edge of the back continues on to the 2nd ring of the dorsal, and the upper edge of the tail comes forward upon the anal ring.

Descr.—The diagnosis shows us that this species is allied to *spicifer*. The snout, which is a little recurved in its height, is somewhat shorter than the head, and the belly is slightly acute. Tail-rings 34. On the short dorsal there are three rows of black spots, and a black speckling on the greyish ground-colour of the caudal, whose border is lighter. On the seven specimens discoloured by alcohol, belonging to the Leyden Museum, there is a trace of a darker transverse bar on each ring, which is also one of the characters of *spicifer*. The Paris Museum possesses a male, in which the distinctly keeled belly is black.

Rad.—P. 14; D. 21; A. 2; C. 10.

Entire length 4·53 inches. Length of snout 0·32 inch; of head and snout together 0·59 inch; from the top of the snout to the anus 0·59 inch; of tail, 2·80 inches; of the dorsal fin 0·35 inch.

5. Syngnathus flavescens, *Kp.*

Diagn.—Snout half the length of the head, traversed up to the mouth by a crest; 12 rings before the dorsal, which stands on 11 rings, three of them belonging to the body. Tail-rings 37.

Descr.—This species resembles *S. Agassizi*, but has on both sides of the head traces of a line in relief, which extends from the orbit to the hind-head; sunken lines on the middle shield of the occiput, on the nuchal shield, and on the dorsal surface of the pectoral ring, which parts are merely shagreened in *Agassizi*.

Rad.—P. 12; D. 37; A. 3; C. 10.

I have seen a female specimen only, which measured 3·55 inches in length. Length of its head 0·49 inch, of body 1·42 inch, of tail 2·13 inches, of dorsal fin 0·59 inch.

A specimen at Leyden, brought from Tripoli by M. Clifford.

B. *Species having the keel restricted to the fore parts of the gill-cover.*

6. Syngnathus pelagicus, *Linn.*

Syngnathus pelagicus, *Bloch*, t. 109. f. 3.

Diagn.—Lateral line interrupted at the first tail-ring. The high black-striped dorsal fin standing on seven or eight rings, of which two are body-rings; 15 rings before the dorsal, and 17 up to the anal ring. Under the lateral line, on the extremity of each ring, a narrow, perpendicular white band bordered with black, which as it rises on the margin of the back becomes darker.

Descr.—One of the commonest species, and found in every collection, and in all seas. Snout tolerably long, and measuring from the fore-border of the orbit, as much as the space from thence to the base of the pectoral fin. Body higher than broad. Tail-rings 32. The egg-pouch pretty short, and occupying scarcely half the length of the tail.

Rad.—P. 17; D. 26–28; A. 4; C. 10.

This species varies greatly. Some individuals resemble Bloch's figure, and exhibit two or three perpendicular bars, with unspotted intervening spaces. The silver-coloured stripes are sometimes reduced to mere spots. On the tail there are cross-bars, and sometimes merely traces thereof. The under-piece of the gill-cover and the higher portion of the pectoral ring exhibit a golden lustre. A male in the Paris Museum, under the name of *Typhlus anonymus*, Bibron, has the snout and gill-cover striped with black, and the silvery-white cross-belts are oval and yellowish. This variety is 5·79 inches long. Length of its head 0·71 inch, of its dorsal fin 0·63 inch, of its tail 3·35 inches.

The Frankfort, British and Berlin Museums possess individuals from the Brazils, Falkland Islands, Cape of Good Hope and Australia.

7. Syngnathus Temminckii, *Kp.*

Diagn.—Snout as long as the distance between the hinder border of the orbits and the extremity of the gill-cover. Head and snout roughly shagreened, and measuring one-ninth of the whole length. Seventeen body-rings before the dorsal fin. Tail-rings 37. Dorsal fin standing on 9 rings, of which two belong to the body.

Descr.—This species is distinguished, by its combined characters, from the others which inhabit the seas round the Cape of Good Hope. The prominent line on the snout is not toothed, and the lateral line is interrupted. Thirty-one rays exist in the dorsal fin, which is somewhat longer than the head. Colour a smutty yellowish-brown, irregularly speckled. A female 6·26 inches long, has a snout 0·28 inch long, the tail 3·66 inches, and the dorsal fin 0·73 inch. In a smaller male of 5·08 inches, the egg-pouch measures 1·58 inch. Its predominating colour is brownish with smutty yellowish specks.

A male and a female specimen, procured by M. Horstock at the Cape, exist in the Leyden Museum; and I have named the species after the Director of that Museum out of gratitude and esteem.

8. Syngnathus brevirostris, *Hempr. et Ehrenb.*

Diagn.—Snout, measured from the fore-border of the orbit, as long as the distance between the hinder border of the orbit and the edge of the gill-cover; it is furnished with a keel, which runs on the same level with the forehead. Hind-head somewhat elevated. Seventeen rings before the dorsal fin, which stands on 8 rings, two of them belonging to the body. This fin has 30 or 31 rays, and equals the head in length.

Descr.—This species comes near *S. Agassizi* and *S. Muræna*, both of which have a longer and more slender snout, and a dorsal fin shorter than the head; also a more sudden descent of the forehead to the snout. The colour is reddish, finely dotted with black and lighter points. A young female shows narrow clear cross bands, separated by wider intervals. The inner side of the scales over the egg-pouch of the male is reddish with white specks, and the skin of the pouch is flesh-coloured. Dorsal fin diaphanous, and speckled with black at the base between its rays. A male having a total length of 4·65 inches, has the head 0·55 inch long, the snout 0·24 inch, the body, up to the anal ring, 1·26 inch, the dorsal fin 0·55 inch, and the egg-pouch 1·38 inch long.

There are two specimens in the Berlin Museum, which were procured at Trieste by Ehrenberg and Hemprich.

9. Syngnathus Agassizi, *Michahelles.*

Syngnathus Agassizi, *Michah. Isis*, 1829, p. 1013.
Syngnathus luculentus, *Rathke*, 1842, *in Nordmann's Pisces dans la Voyage en la Russ. mér. par Demidoff*, pp. 132, 133.

Diagn.—Snout as long as the head. From 13 to 16 rings anterior to the dorsal fin, and 15 to 18 before the anal ring. Dorsal fin standing on from 7 to 10 rings, of which one or two belong to the body. Tail composed of from 35 to 39 rings.

Descr.—On account of the small size common to this species and *abaster*, they may be confounded with one another, but the longer and more slender snout, destitute of a thin crest, the absence of the prominent line encompassing the forehead and occiput, or its less distinct expression than in *abaster*, sufficiently distinguish *Agassizi*, which is in addition more elongated. Nordmann's excellent figure in Demidoff's Voyage shows three white silvery spots on the silvery scales of the edge of the belly.

Rad.—P. 15; D. 22; A. 3; C. 10.

In the Paris Museum this species is kept under the name of *S. littoralis* of Risso, which properly belongs to the *Nerophis ophidion* of Risso. I saw a great many examples in Paris, sent from Dalmatia by Michahelles, and others from the Black Sea by Nordmann. From the latter quarter, also, the Vienna Museum received specimens. The largest number, however, in the Paris Museum, were transmitted by Savigny from Naples. Rathke sent a female from Norway to the Berlin Museum, and Demidoff two from the Black Sea.

The species may be confounded with young individuals of *S. rubescens*, but these have a slender head, a longer snout, and a dorsal fin shorter than the head. A large female, having a length of 5·49 inches, has the head 0·67 inch long, the snout 0·35 inch, the body 1·69 inch, and the dorsal fin 0·75 inch long. A male 5·40 inches of total length, has the head 0·63 inch, the snout 0·32 inch, the body 1·46 inch, the dorsal fin 0·55 inch, and the egg-pouch 1·58 inch long.

10. Syngnathus Cuvieri, *Kp.*

Diagn.—Snout half the length of the head. Hind-head short and elevated. No prominent line between the orbit and hind-head. Eleven or twelve rings before the dorsal fin, of which two belong to the body.

Descr.—Head broader at the bulging gill-covers and at the pectoral ring than in *Agassizi*, the breadth at the latter place being as seven to five in *Agassizi*. Tail-rings 40. Egg-pouch occupying 22 rings. Dorsal fin having from 38 to 41 rays, and measuring from 0·79 to 0·91 inch in length. A female, having a total length of 5·44 inches, has the following measurements of parts:—of the head 0·65 inch, the body 1·93 inch, the dorsal fin 0·79 inch, the tail 3·51 inches. A male measures as follows:—entire length 6·90 inches, length of head 0·63 inch, of body 1·97 inch, of dorsal 0·91 inch, of egg-pouch 1·97 inch, and of tail 3·74 inches. Colour reddish, with numerous fine yellowish specks. Under-piece of the gill-cover and the belly silvery or white.

The Leyden Museum possesses a great number of specimens of all ages from Catwyk in the North Sea, and the Paris Museum one only from Naples, sent by Savigny.

11. Syngnathus abaster, *Risso.*

Syngnathus abaster, *Risso, Hist. Nat.* p. 182.

Diagn.—The short snout is surmounted by a leaf-like crest, which is notched near the mouth, and stands higher than the forehead and orbits. A strongly prominent line passing over the nostrils and orbit encompasses the hind-head.

Descr.—A very distinct and interesting species; the following description of which is taken from four male and as many female specimens that were sent to the Paris Museum by D'Orbigny under the above name from Rochelle. The forehead is broad and concave, and the flatly convex hind-head is encompassed by a prominent edge that proceeds from the projecting orbit. There are 15 rings before the dorsal fin, which stands on 9 rings, of which one belongs to the body. No break exists at the junction of the lateral line with the upper edge of the tail. The back is made concave by the prominence of its edges, and the belly is distinctly keeled. Colour brownish, with fine yellowish specks. A handsome female shows an interrupted cross bar on each ring, and a black spot near the back, with the ventral keel darker. Another female wants these distinct markings. The males are spotted all over with fine light spots besprinkling a dark ground. Tail-pouch yellowish, with darker specks near the scales.

A large male, measuring 5·40 inches of total length, has the head 0·59 inch long, the back-fin 0·63 inch, and the tail 3·43 inches long.

Rad.—P. 12; D. 33; A. 3; C. 10.

I could not have recognized this species from Risso's description, which is by no means accurate; but I must conclude that the French savants have compared that description with Risso's specimens still existing in his collection.

12. Syngnathus Muræna, *Kp.* (Brit. Mus.)

Syngnathus obsoletus, *Paris Mus.*
Typhlus obsoletus, *Bibron, MSS.*

Diagn.—Length of the snout from the fore-border of the orbit as long as the distance between the posterior border and the extreme edge of the gill-cover; 16 rings before the dorsal fin, which stands upon 5 caudal rings.

Descr.—A small, dark-coloured species. It is greyish-brown, marbled with black. The gill-cover lineated and speckled. The head shagreened and destitute of a crest and of any elevation of the hind-head, or having merely a trace thereof. Hind-head and nuchal shield feebly keeled. 36 caudal rings, 18 rings belonging to the egg-pouch. No interruption at the confluence of the lateral line with the edge of the tail. All the scales of the rings are rough in proportion to the size of the species.

A large male has the body 1·89 inch long, the back fin 0·51 inch, the egg-pouch 1·69 inch, and the tail 3·07 inches long.

Rad.—P. 12; D. 28; A. 3; C. 9.

The British Museum possesses a great number of specimens obtained on the north coast of Africa, and four males exist in the Paris collection.

13. Syngnathus Rousseau, *Kp.*

Diagn.—Lateral line interrupted above the anal ring. Of the 7 rings on which the dorsal stands, two are body-rings. Each ring is interrupted by a short marginal spine. There are 14 rings before the dorsal fin, and 16 body-rings, including the anal one, with 34 caudal rings.

Descr.—A male transmitted to the Parisian collection from Martinique by Alexander Rousseau, is unfortunately not in good condition, and of its pectoral and dorsal fins there are merely traces remaining. The moderately developed caudal fin has, as usual, 10 rays. Measured from the front of the orbit, the snout has a length equal to the distance from the same place to the edge of the gill-cover.

14. Syngnathus Phlegon, *Risso.*

Syngnathus Phlegon, *Risso, Hist. Nat.* p. 181.

Diagn.—Lateral line reaching to the first caudal ring, interrupted. Dorsal fin supported by 13 rings, two of which are body-rings. 16 rings anterior to the dorsal, and 18 when the anal one is included. A spine terminates each ring.

Descr.—A handsome species, to be recognized at a glance by its silvery sides and belly, and which may be further known by its high dorsal fin, long tail, and spiny angles. The length of the slender snout from the projecting pointed fore-corner of the orbit exceeds the distance between the same point and the base of the pectoral fin. The wrinkled snout is rough, and toothed on its dorsal aspect. Between the elevated orbits there are prominent longitudinal and cross stripes, and the hind-head is somewhat elevated at its slightly keeled shield, which has two notches next the nuchal shield. The oval gill-cover, nearly as broad as it is high, is crossed by distinct, rough bars. Sixteen rings enter into the composition of the body, which is much higher than it is broad; and the pectoral ring is concave on its dorsal aspect and convex on its ventral one. Pectoral fin, in comparison with *Acus*, moderately long; 12 or 13 rings sustain the long and high dorsal fin, which contains from 40 to 42 rays. Tail almost twice as long as the body, and composed of 50 rings.

A female, 8·27 inches long, has a tail measuring 5·12 inches. Each body- and tail-ring has a blackish spot. The belly is striped beneath the lateral lines, and the under part of the gill-cover is silvery-white. Caudal fin black. The length of the egg-pouch is such, that it terminates an inch from the point of the tail. My description is drawn up from a male in the Vienna Museum sent from Palermo, a female in the Frankfort Museum, several males in the British Museum from Cosseir, and from a great number of specimens in the Parisian Museum obtained from Risso, and also from three individuals sent from the Cape of Good Hope to the Leyden Museum by Horstock.

15. Syngnathus Acus, *Linn.*

Syngnathus Acus, *Bloch*, t. 91; *Yarrell*, p. 432.

Diagn.—A denticulated crest on the convex, oval hind-head. Dorsal aspect of the snout also denticulated. Snout not so long as that of *tenuirostris*. Eighteen body-rings. Dorsal

fin longer than the snout and head together, standing on 9 or 10 rings, and supported by 39 or 40 rays.

Descr.—This species attains to a great size, authors say even to 3 feet, though I have met with none exceeding 16 inches in length. From the acute and projecting upper border of the orbit a raised edge runs to the elevated and scarred hind-head, which has a median longitudinal line rising in relief. There is also on the dorsal aspect of the snout a raised line, which entering between the orbits reaches the forehead. Gill-cover swollen, with a prominent line at its commencement, and in both directions roughly pointed and striped. Back slightly concave. Lateral line interrupted at the anal ring. Cross-bands are shown more or less distinctly on the body and tail by well-preserved specimens, and on the tail there are irregular longitudinal streaks, as in *tenuirostris*.

	A male.	A female.	A female.	A female.	A male.
Total length.....	13·40 in.	13·79 in.	14·92 in.	15·12 in.	16·95 in.
Length of snout	1·06 ,,	1·02 ,,	1·20 ,,	1·20 ,,	1·02 ,,
Length of dorsal fin	1·65 ,,	1·62 ,,	1·81 ,,	1·89 ,,	1·77 ,,
No. of rays of dorsal fin..	10	10	10	9	10
No. of body-rings	18	18	18	18	18
No. of caudal rings	45	44	45	43	44

Owing to the older authors having described *Siphonostoma typhle* under the name of *Acus*, Linnæus has mingled his references in such a way that they can scarcely be disentangled. *Acus* is found in all museums; obtained from the Atlantic Ocean, rarely from the Adriatic.

16. Syngnathus brachyrhynchus, *Kp.*

Descr.—This has all the characters of *Acus*; but its snout is shorter, being equal in length to the distance between the fore border of the orbit and the proximal edge of the pectoral ring.

A dried male specimen from the Isle of Bourbon, sent by M. Nigou, exists in the Paris Museum. It is, excluding the caudal fin, 11·82 inches long; the head measures 1·42 inch; the snout 0·79 inch; up to the dorsal fin the measurement is 4·64 inches, and the rings of the dorsal fin are 1·38 inch long.

17. Syngnathus variegatus, *Pallas.*

Syngnathus variegatus, *Rathke*, t. 11. f. 7, 8.

Diagn.—The short snout, measured from the fore-angle of the eye, equal in length to the distance from thence to the

distal edge of the pectoral ring, or to the base of the pectoral fin. The space occupied by the dorsal fin a little exceeds the length of the head. There are 17 or 18 rings up to the dorsal fin, which stands on 9 rings.

Descr.—This species approaches nearer to *Acus* and *rubescens* than to *tenuirostris*; but the cross-bands are not so distinct as in the two former species. It inhabits the Black Sea. The Paris and Berlin Museums possess several specimens collected by Count Demidoff and Von Nordmann; *tenuirostris* being mixed with this species in both collections. The Petersburg Museum also possesses specimens.

18. Syngnathus rubescens, *Risso*.

Syngnathus ferrugineus, *Michah. Isis*, 1829, p. 1013.

Diagn.—Length of the snout measured from the proximal border of the orbit equal to the distance from thence to the extremity of the pectoral ring, or a little more. Head longer than the space occupied by the dorsal fin, which stands on from 7 to 9 rings. Body-rings from 16 to 18.

Descr.—This species is intermediate between *Acus* and *tenuirostris*, and is not easily distinguished. Its snout is longer and generally more slender than that of *Acus*, but not so long as that of *tenuirostris*. In nineteen examples the number of body-rings is 16; in two it is 17. In ten individuals the number of rings belonging to the dorsal fin is 7, and in seven others it is 8. The rays of the dorsal fin vary in number from 37 to 39. In some individuals the lateral lines are interrupted on both sides, in others the line is broken on the right or on the left side only, and in others again it unites without break to the upper edge of the tail. The largest number of specimens have a uniform reddish hue, others exhibit cross-bars as in *acus* and *tenuirostris*.

In the Paris Museum there are three dried specimens from the Canaries, collected by Webb and Bertholet, eight procured on the voyage of the 'Zelée and Astrolabe,' and seven others sent by Picart, without any notice of the locality from whence they came; but as they are covered with the same kind of varnish that Webb and Bertholet's have been prepared with, it is probable that they also came from the Canary Islands. The Leyden Museum possesses seventeen specimens in alcohol brought from the Cape of Good Hope by Horstock. Some of these have a uniform reddish tint, others are grey, speckled and barred with black.

This species varies also in the length of the snout, which is moreover more slender in the males. Young individuals have a somewhat different physiognomy, owing to the more developed rostral crest being stretched out more nearly in the plane of the head, which is but slightly elevated. The dark cross-bands are bordered posteriorly with white, and there are bluish-white spots along the ventral line. The ground-colour is grey marbled with brownish tints.

19. Syngnathus tenuirostris, *Rathke*.

Syngnathus tenuirostris, *Rathke et V. Nordmann, Pisces, in A. de Demidoff's Voy. dans la Russie mér.* t. 11. f. 1, 2.
Syngnathus Acus, *Michahelles*, Isis, 1829, p. 1012.

Diagn.—The long, thin snout measured from the proximal border of the orbit is equal in length to the distance from thence to the second body-ring. Body-rings from 15 to 17. Dorsal fin standing on from 7 to 9 rings, having 35 or 36 rays, and occupying a space much shorter than the length of the head and snout together.

Descr.—This handsome and easily determined species approaches nearest to *Acus*, but its occipital crest and the edges of the back and belly are more distinctly toothed. I never saw a full-grown *Acus* with so lengthened a snout: a specimen of *Acus* measuring 15¼ inches, has a snout no longer than that of an individual of *tenuirostris*, whose total length does not exceed 9½ inches. The numbers of rings and lengths of the snouts of nine specimens are here subjoined.

	Total length.	Length of snout.	No. of body-rings.	No. of rings belonging to the dorsal fin.	No. of caudal rings.
	inch.	inch.			
1. A male....	8·67	0·94	17	8	42
2. A female ..	8·87	0·87	15	8	39
3. A male....	9·46	0·98	17	7	40
4. A male....	9·65	0·95	16	9	43
5. A female ..	9·85	0·95	17	8	42
6. A male....	9·85	0·91	16	8	40
7. A female ..	12·41	1·30	17	8	42
8. A male....	12·60	1·18	17	8	40
9. A female ..	13·00	1·30	17	8	40

An inhabitant of the Adriatic and Black Seas. Various specimens in the British and Parisian collections.

20. Syngnathus fasciatus, *Jam. & Kay.*

Syngnathus fasciatus, *Jam. & Kay, Zool. of New York*, p. 319. f. 175.
Syngnathus typhle, *Mitch. Trans. Lit. & Phil. New York*, i. p. 175.

Diagn.—The high dorsal fin, having 17 rings before it, standing on 9, of which 4 belong to the body, and supported by 34 or 35 rays, has a brownish colour with about nine oblique whitish bars.

Descr.—This species comes near to *Acus*, but is easily distinguished from it by the diagnosis. It shows twelve or thirteen dark, or darkly marbled, cross-bands on the body and tail, on a lighter ground-colour. The snout is shorter, being no longer than the distance between the proximal border of the orbit and the distal edge of the gill-cover. The back is thinner and more concave.

Rad.—P. 15; D. 34 or 35; A. 3; C. 10.

In the Parisian Museum there is a female specimen which was sent from New York by M. Mibbert, and a younger female one from Savannah, sent by Madame Harper. This last is of a uniform colour, with a golden lustre on the gill-cover. Length of its head 0·67 inch; length of head and body 2·17 inches; of the dorsal fin 0·63 inch; of the tail 3·22 inches.

21. Syngnathus Delalandi, *Kp.*

Typhlus Delalandi, *Bibron in Mus. Paris.*

Diagn.—Length of the slender snout equal to the distance between the fore border of the orbit and the root or end of the pectoral fin. Head and snout together either a little shorter or a little longer than the space in which the dorsal fin stands. The dorsal is based on 10 rings, and there are from 18 to 20 rings before it.

Descr.—In the Paris Museum there is a Cape of Good Hope specimen, procured by Delalande. Its snout is more slender than that of *rufescens*, and the body longer, but the tail again shorter. The colour is a uniform brown, with a bronze lustre. Its length is 7·12 inches. Length of its head 0·91 inch; of its snout 0·51 inch; of the body, measured from the edge of the pectoral ring to the vent, 2·17 inches; of the dorsal fin 0·95 inch; of the tail 4·25 inches. In the Berlin Museum there are two male specimens sent by M. Krebs, also from the Cape seas. Length 5·91 inches; of head 0·82 inch; of the snout 0·47 inch; of the body 1·85 inch; of the dorsal fin 0·78 inch; of the tail-

pouch 1·85 inch. These have 18 rings before the dorsal fin, whose length rather exceeds that of the snout and head together; their colour is reddish-brown with lighter and darker specks.

22. Syngnathus Schlegeli, *Kp.*

Syngnathus tenuirostris, *Temm. et Schleg. F. Japon.* t. 120. f. 5.

Diagn.—Snout elongated and very slender, equal in length to the distance between the fore border of the orbit and the base of the pectoral fin. Length of the dorsal fin fifty times its height and twice the length of the snout.

Descr. of the original specimen belonging to the Leyden Museum.—Head more lengthened and not so high as that of *Acus*. There are 18 rings before the dorsal fin, which stands on 9 rings, and is supported by 35 rays. The roof-shaped scales lying over the egg-pouch are more developed than in *Acus*. Colour brownish-grey, with darker specks on the tail. The dorsal translucent, and bluish without spots. I have seen dried Chinese examples of this species.

Of the *Syngnathus sundaicus* and *S. djarong* of Bleeker I have seen no specimens, and am unable to describe them with sufficient accuracy merely from plates. *S. djarong* is perhaps the *argyrostictus* of Kuhl and Van Hasselt.

Genus 6. LEPTONOTUS, *Kp.*

Diagn.—In the females the body is laterally much compressed, the back very narrow, and the belly acute. The dorsal profile rises suddenly behind the pectoral fin.

Descr.—The female has a knife-like acuteness of the back, and in advanced age the height of the body is five times its breadth; but in the young it is merely from one and a half to three times the breadth. The tail is nearly twice the length of the body.

1. Leptonotus Blainvillii, *Kp.*

Syngnathus Blainvillianus, *Eydoux et Gerv. in Guérin, Mag. Zool.* iv. t. 16.

Diagn.—Lateral line uniting by an arch with the upper edge of the tail. Body-rings 19. Tail-rings 50. Dorsal fin standing on 10 rings, of which two belong to the body.

Descr.—Length of the snout equal to the distance between the fore border of the orbit and the base of the pectoral fin. A smooth crest runs from the forehead to the mouth. Head scarred and traversed by elevated streaks. A line in low relief runs between the orbit and hind-head; and there is a small keel on the occiput, nuchal shield and pectoral ring. Gill-cover bulging, with a trace of a keel at its origin, and stripes in both directions. An old female in the British Museum, which I have figured, has a yellowish-brown colour, with black back and belly. Mr. Bridges brought it from South America. Its body is four times as high as it is broad. Another female, not so long, but having a higher body, has a bronze lustre on the body and gill-cover, silvery pectoral ring and belly, and traces of bluish cross-bars on the first and last body-rings. It was sent from Peru by M. Dubois to the Paris collection. An old female, collected during the Voyage of the Favorite by Eydoux, is the one whose portrait I have given. A young female in the British Museum shows traces of cross-bars on the tail. A moderately old female has the back neither so much compressed nor so high, yet with some elevation in the middle of its length. The ground-colour in this one is yellowish-brown: it is from Peru, and was presented to the Paris Museum by M. Dubois. Another young female, 5·08 inches long, is only one and a half times as high as it is broad, and the back is only half the breadth of the belly. The general colour is dark brownish-green, with lighter belly and gill-cover: it is also in the Paris Museum. A male in the British Museum, which has an egg-pouch 1·69 inch long, has a projection of the belly at the 8th ring, a cross-belt on each ring, and is irregularly speckled with white and yellowish spots. It was sent from South America by Mr. Bridges. A male measuring 5·91 inches in length, and having a ventral pouch of 1·13 inch, is dark, with five still darker cross-bars on the body. The back and sides are traversed by slender interrupted black lines, and are dotted. It belongs to the Paris Museum, and is from the Auckland Islands. A very young female in the British Museum shows 5 cross-bands on the body and 12 on the tail. A male from New Zealand, presented to the Paris Museum by M. De Belligny, is finely dotted by irregular brown spots having black borders. The old female which is here figured is 8·62 inches long. The length of its head is 1·14 inch; of its snout 0·68 inch; its greatest height is 0·63 inch; its thickness 0·16 in.; and the length of its tail 5·20 inches.

Rad.—P. 13; D. 35 or 36; A. 3; C. 10.

It is a native of South America, Peru, Chili, Auckland Islands, and New Zealand.

2. Leptonotus semistriatus, *Kp.*

Diagn.—Under the interrupted lateral line 19 cross stripes; above that line yellow spots with black borders.

Descr.—Snout longer than the head, and when measured from the fore angle of the eye, equal in length to the distance from thence to the base of the pectoral fin. Body-rings 19. Tail-rings 48. Dorsal standing on 10 rings, whereof three belong to the body. Colour yellowish-brown, the belly whitish.

Rad.—P. 12; D. 38; A. 3; C. 10.

Entire length 9·34 inches; length of head 1·46 inch; of the snout 0·85 inch; of the tail 5·32 inches. Its greatest height is 0·67 inch, and its breadth 0·20 inch.

The specimen is in the British Museum; its origin is not noted.

Genus 7. SIPHONOSTOMUS, *Rafinesque.*

Diagn.—Pectoral ring cleft on its ventral aspect in the middle of its length.

Descr.—A long and pretty thick fish, with a greatly compressed snout, exceeding the head in length, and projecting evenly in the plane of the forehead. The species inhabits the European and African seas.

1. Siphonostomus pyröis, *Bonaparte.*

Siphonostomus pyröis, *Bonap. Cat. Meth.* p. 90. sp. 800. t. 5. f. 40.
Syngnathus pyröis, *Risso, Hist. Nat.* p. 180.
Syngnathus pelagicus, *Risso, Ichth. de Nice*, 63. 3.

Diagn.—Snout the shortest and highest of the genus. The space between the front of the orbit and the extremity of the flat gill-cover bears a proportion to the length of the snout up to the leaf-like prolongation of its lower piece, of one to one and a half.

Descr.—It has a higher hind-head than the other specie, and the forehead is rough, but not concave. The seven edges of the body are not toothed, and the dorsal fin standing on 8 caudal rings is supported by from 31 to 34 rays. There are 17 body-rings, or 18 if the pectoral ring be included, and the tail is composed of 35 rings. This species is less slim than *Rondeleti.*

Risso describes a very large individual 15·76 inches long, and says that the colour of its back was a mixture of grey, brown and greenish tints with whitish spots. The belly white, with a silvery lustre, marbled and variegated by golden lines and markings. Risso also notices a variety having a more reddish hue, whose dimensions were less. It is probable that the first figure of Rondeletius represents this species. The Vienna Museum possesses a specimen.

2. Siphonostomus typhle, *Bonap.*

Syngnathus typhle, *Linn.*; *Yarrell, Brit. Fishes*, p. 139.
Siphonostomus typhle, *Bonap. Cat. Méth.* p. 89. t. 5. f. 42.
Willughby, p. 158. t. 25. f. 1.
Syngnathus acus, *Eckström, die Fische der Mörkö*, p. 123. t. 6. f. 1, 2.
Siphonostoma acus, *Rafinesque*, p. 35.

Diagn.—Snout bearing a greater proportion than one and a half to the space between the front of the orbit and the distal edge of the gill-cover. Hind-head almost flat, and the forehead between the eyes somewhat concave. The seven edges of the body are not toothed. Dorsal fin supported by 38 or 39 rays on 9 or 10 rings, of which the first is the anal ring.

Descr.—The largest individual seen by Yarrell measured 13 inches. The colour is olive-green, speckled with yellowish-brown and yellowish-white. The belly yellowish. This species never exhibits black cross-lines on the snout like *Rondeletii*. According to Eckström the females are larger, and have at all periods a lighter colour. When we consider the references given by Linnæus, and the minutely observed character of *Acus*, "*Truncus scutis subtilissime striatis*," and the distinctive peculiarity of *typhle*, "*rostrum tenue subcompressum*," introduced as parts of his description, it becomes evident that he has drawn that description from both species. His further observation, "*Pedem longitudinis vix excedens*," belongs to *typhle*, since *Acus* attains a length of 2 feet. A dotted dorsal fin is moreover a character of *Acus*, and not of *typhle*, whose dorsal is of one colour. The species may likewise be confounded with the following one, but the snout is smaller and more slender; it is scarcely so high as the diameter of the orbit. In *typhle* the acute dorsal crest of the snout is not so much developed, and the

leaf-like appendage of the under piece of the mouth does not project so far.

This fish seems to be more rare on the coasts of Britain than on those of Norway and Sweden.

3. Siphonostomus Rondeletii, *Bonap.*

Syngnathus Rondeletii, *Delaroche, Ann. du Mus.* 1809, t. xiii. p. 324. pl. 21. f. 5.
Syngnathus viridis, *Risso, Hist. Nat.* p. 179 (1826); *Ichth. de Nice*, p. 65 (1810).
Syngnathus rhynchænus, *Michah. Isis*, 1829, p. 1014.
Siphonostomus Rondeletii, *Bonap.* t. 5. f. 41.

Diagn.—Length of the snout exceeding one and a half times the distance between the front of the orbit and the extremity of the gill-cover. Hind-head and space between the eyes flat. Pretty deep lines divide the forehead from the orbits.

Descr.—The seven edges of the body are not toothed. Eight or nine rings sustain a dorsal fin, which is extended by 37 rays; and there are 18 or 19 body-rings, and from 33 to 35 caudal ones. According to Risso the back is bright green; the sides and belly are yellowish-green, gilded by a golden lustre, and ornamented by silvery spots and some dark lines. A variety exhibits a brownish-green hue with blackish cross-bars. Those which I have seen have irregular transverse lines on the snout, a longitudinal line near the eye, and another line running obliquely from the point of the snout to the middle of the eye. Some have clear round spots on the gill-cover, others have irregular markings on the breast and belly, while others again are ornamented by a fine network, and exhibit a golden or silvery lustre on the gill-cover; and some few display on a greenish ground-colour white spots arranged in roundish figures.

4. Siphonostomus argentatus.

Syngnathus argentatus, *Pallas*, according to *Nordmann, in Demidoff's Voyage.*

Diagn.—Head and edges of the body toothed.

Descr.—Snout more than one and a half times the length of the space between the fore corner of the eye and the extremity of the gill-cover. The hind-head almost flat, and the interval

between the orbits and nostrils moderately concave. Dorsal fin sustained by 39 rays upon 9 caudal rings; and the egg-pouch attached to 24 caudal rings.

This species inhabits the Black Sea. Sundry examples of it exist in the Vienna collection, and two in the Paris Museum obtained from Nordmann.

5. Siphonostomus rotundatus.

Siphonostomus rotundatus, *Bonap.* t. 5. f. 44 (the under figure); *Cat. Méth.* p. 90.
Syngnathus rotundatus, *Michah. Isis*, 1821, p. 1014.

Diagn.—The snout more than twice as long as the space between the fore border of the orbit and the extremity of the gill-cover.

Descr.—This is the smallest species with the longest snout. The hind-head is slightly elevated, and there is a concavity between the orbits and nostrils. Its body has the thickness of a goose-quill, and the translucent dorsal is extended by 32 rays on 9 caudal rings. There are 17 body-rings and 34 caudal ones. The egg-pouch is suspended to 21 rings. In the middle of each ventral scale there is a prominent transverse line which forms a cross with a longitudinal line. Michahelles makes a mistake in ascribing to this species five angles, since it has the customary seven angles. It is found at Trieste. Numerous specimens obtained from Michahelles exist in the British Museum, and the Vienna collection contains many from Heckel.

Genus 8. LEPTÖICHTHYS, *Kp.*

Fistularia, *Quoy and Gaimard.*
Typhlus, *Bibron, Paris Museum.*

Diagn.—Snout very long, thin and much compressed, extended in the same plane with the finely shagreened head. Body unusally elongated, hexagonal, with flat back and belly without intermediate scales. All the fins are much developed, especially the caudal one. The gill-opening is a longer slit than usual.

1. Leptoichthys fistularius, *Kp.*

Typhlus fistularius, *Bibron.*

Descr.—This highly interesting species is possessed solely by the Paris Museum, to which a female example was sent by Quoy and Gaimard. In its very long snout it accords with *Syngnathus*, *Siphonostomus*, *Doryrhamphus*, and more particularly with *Stigmatophora*. By its six-sided roundish body it resembles *Nerophis*; but its unwontedly long thin snout and developed fins distinguish it at the first glance from all the other *Lophobranchii*. Head oval, occipital shield small, and a furrow commencing at the orbit accompanies the rostral crest. Up to the anus there are 27 body-rings, 24 of them before the dorsal, which stands on 9 rings, 3 of them belonging to the body. The tail is four-cornered, higher than it is broad, and composed of 24 long rings. Colour yellowish-brown, with a black cross band on each ring; ventral piece of the pectoral ring and the gill-cover silvery.

Entire length 22 inches. Length of snout 1·97 inch; of head and snout 2·76 inches; of dorsal fin 1·97 inch; of tail 9·46 inches. The middle ray of the caudal, though it is assuredly not entire, is 0·91 inch long.

Rad.—P. 21; D. 37; A. 3; C. 10.

It inhabits King George's Sound. Until we become acquainted with the male fish, it is difficult to classify this species. It may possibly belong to the *Nerophinæ*, or it may be the type of a peculiar subfamily.

Genus 9. STIGMATOPHORA, *Kp.*

Diagn.—A pectoral fin, but no caudal one.

Descr.—A thin acutely ridged snout, greatly prolonged in the same line with an even and nowise elevated head, has its mouth directed upwards. The snout, head, and gill-cover are finely shagreened, and the head is divided into irregular bucklers by sunk lines; but the nuchal shield and breast-ring are not so divided, though the latter is separated on its dorsal aspect into two shields, whilst on its ventral aspect it tapers to a point without division. Three rays support the anal fin. The body is broader than it is high, and the dorsal fin, which is unusually long, stands on 19 rings. Tail heptangular to its finely tapering point. In the head, snout, and general form this genus is connected to the others, which have five fins. It is only by its fin-

less tail that it comes nigh *Nerophis*. As yet only two species are known.

1. Stigmatophora Argus, *Kp.*

Syngnathus argus, *Richardson, Voy. of Ereb. & Terror, &c.*

Diagn.—A great number of round black dots on the dorsal aspect.

Descr.—Snout measured from the fore border of the orbits twice as long as the distance from thence to the extremity of the gill-cover. Body, including the breast-ring, composed of 21 rings. The long dorsal fin begins with the 12th ring and ends with the 30th, ten of its rings belonging to the body. The anus is under the 19th. An old female specimen having a length of 8·27 inches, has a head 3·23 inches long, a snout 0·87 inch long, a tail of 4·65 inches, and a dorsal fin 1·81 inch long. A small male exhibits an egg-pouch 1·26 inch long, striped with black. The colour is brownish olive-green, with black edges to the tail. The under surface of the body and tail is dusky yellow, with a great many elevated lines on each scale.

Rad.—P. 16; D. 52; A. 3; C. 0.

A specimen obtained by Mr. Stanley in New Guinea exists in the British Museum; and there are eight in the Paris Museum procured by M. Verreaux in Tasmania.

2. Stigmatophora nigra, *Kp.*

Diagn.—The snout measured from the nostrils as long as the distance from thence to the base of the pectoral fin. Dorsal fin attached to the 5th and succeeding rings up to the 22nd inclusive, eleven of the rings belonging to the body, and the anus being under the 16th.

Descr.—Snout shorter than that of *Argus*, and not twice the length of the head. It is slender, with an elevated mouth. A furrow runs from the nostril to the mouth, and the dorsal surface of the snout is keeled. From the slightly projecting orbit a prominent line runs as far as the nostril. A roundish-oval occipital shield sends a long tongue-shaped projection between the orbits, and a fine prominent line extends from each orbit to the hind-head. A prominent line divides the gill-cover into two unequal parts, of which the upper one is the smaller and is dark-coloured. Both the occiput and gill-cover are finely shagreened. Traces of keels exist in the middle of the elongated pectoral

shield, which equals the operculum in length. The colour is brownish; the breast and belly and the largest part of the gill-cover being smutty-yellowish. There are 16 body-rings, and 14 rings belonging to the egg-pouch.

Rad.—P. 12; D. 39; A. 2; C. 0.

The Paris Museum possesses two Tasmanian specimens sent by M. Verreaux.

Subfam. 3. DORYRHAMPHINÆ, *Kp.*

The males have the egg-pouch not on the tail, but on the breast and belly.

Genus 1. DORYRHAMPHUS, *Kp.*

Diagn.—No pits along the nuchal shield. Rows of spines on the snout, and two projections on its under part. All the angles of the body serrated. The border of the egg-pouch furnished with two tender membranes that completely cover the eggs. Tail shorter than the body.

1. Doryrhamphus excisus, *Kp.*

Descr.—I am acquainted with a pair of examples of this species belonging to the Paris Museum, and five very young ones in the Berlin Museum, collected by Hemprich and Ehrenberg in the Red Sea. The largest specimen of the Paris Museum has a length of 2·44 inches; the head measures 0·51 inch, the body 1·06 inch, the short tail 0·59 inch, and its unusually long fin 0·91 inch. The dorsal fin is 0·28 inch long.

Measured from the fore border of the orbit, the snout is as long as the distance between the hinder edge of the orbit and the extremity of the gill-cover. Next the nostril there are three coalescent spines, and there are six standing close together on the end of the snout. A row of short spines runs from the under edge of the orbit, and a row extends from behind the orbit to above the tubular nostril. The occiput is finely shagreened and is keeled on its extremity. There are also sundry short prominent lines near the operculum. The operculum itself is divided into very unequal parts by a keel, the upper part being the smallest. With the medial keel of the operculum three or four prominent lines are connected. Near the pectoral fin there is a keel on the breast-ring, and the fin, which is unusually large, contains 20 rays. The back is narrow, and there is a furrow above

the breast-ring, in which there lies a short keel that issues from the occipital one and ends above the gill-opening. There are 12 rings before the dorsal fin, 16 up to the anus, and 14 in the tail. Twenty rays support the dorsal on 7 rings. The upper caudal edge reaches forwards to the under border of the 2nd ring of the dorsal fin; and the caudal fin has 9 or 10 rays.

The colour is brownish-yellow, with a blackish-brown streak along the side of the snout, through the eye and along the back; the lateral line and the tail are also blackish-brown; while the yellowish caudal is spotted with black. The smaller and younger female specimen is heptangular, with a black belly, and the spines of the back and snout are not so fully developed.

Genus 2. CHÖEROICHTHYS, *Kp.*

Diagn.—The short body arched on the back and belly. The snout destitute of spines and projections on its under part, slender and rising upwards near the mouth. Lateral line unusually projecting and uniting with the under edge of the tail. On the small nuchal shield there are no pits. The egg-pouches of the males are furnished with a membrane. The fins are not much developed.

1. Chöeroichthys Valencienni, *Kp.*

Descr.—In the Paris Museum there is a male specimen, which was sent from the Isle of Bourbon by M. Mathieu. It is a diminutive but highly interesting form, which I have named as a testimony of my respect for the great Ichthyologist of the age. The slender snout measured from the nostrils equals the head in length, and is furnished with a crest. A prominent line runs from the hind-head over the eyes to the end of the snout; another descends from the nostrils down to the under border of the orbit, and goes on also to the end of the snout, and there is a third and a fourth on the under borders of the snout. Occiput rough and, like the nuchal shield and dorsal surface of the breast-ring, keeled. A keel divides the operculum into two dissimilar parts. In the upper portion there is an oblique prominent line, and in the under portion there are seven rough cross-lines. From the elongated breast-ring to the dorsal fin there are 11 rings; 15 rings up to the anus, and 18 in the tail. The dorsal stands on 4 body-rings and 1 caudal ring. The ventral aspect of the breast-ring is keeled, and near the pectoral fin there are two elevated lines. Back concave, with toothed edges. Colour

smutty dark brown, with a black caudal having a light border, and rays yellow and speckled. There are traces of cross-bars on the tail. The length of the specimen is 1·85 inch, of the head 0·39 inch, of the snout 0·20 inch, of the dorsal fin 0·20 inch, of the tail 0·69 inch, and of the caudal fin 0·04 inch. The height of the body is 0·20 inch, and its breadth on the lateral lines is 0·14 inch.

Rad.—P. 20; D. 22; A. 3; C. 10.

Genus 3. DORYICHTHYS.

Diagn.—The elongated and compressed snout is devoid of spines. Near the gill-cover there are two long thin bones, jointed to the occiput, which include between them a slit-shaped cavity. The four-cornered tail is shorter than the body.

Descr.—The holes on either side of the occiput above the gills are apparently used to admit water into the interior of the body. Body higher than broad and having spiny projecting borders. As far as the dorsal extends the tail is hexangular. The pectoral fins are broad, but not long; and the dorsal is long, but not high. The caudal is not much developed, and the anal is as usual merely rudimentary.

A. *The lateral line interrupted near the anus.*

1. Doryichthys bilineatus, *Heckel.*

Diagn.—The borders not distinctly toothed. Body-rings 17. The dorsal placed on 6 tail-rings.

Descr.—The upper border of the snout twice curved and traversed by three elevated lines. From the fore part of the orbit to the extremity of the pectoral fin the distance is equal to the length of the snout. On both sides of the medial line the halves of the operculum are striped and scarred. The broad forehead is striated and roughened by raised lines. Two lines in relief proceed from the orbit, and there is one in the middle of the occiput. In comparison with that of *aculeatus* and *pristipeltis* the body is higher and broader, and the tail is longer. There are 25 caudal rings.

Rad.—P. 18; D. 33; A. 3; C. 10.

The colour is brown, with black specks on the upper border of the dorsal fin. Caudal fin black.

The Vienna Museum possesses a female specimen.

2. Doryichthys spinosus, *Kp.*

Syngnathus spinosus, *Schlegel.*
Syngnathus boaja, *Bleeker, Bijdrag tot den Trosk. Vissch.* p. 14.

Diagn.—Serrated projections of the borders of the body. Before the dorsal fin 20 or 21 rings, and up to the anal ring 23 or 24. Dorsal fin placed on 9 rings, of which three are body-rings. From the medial line of the silvery gill-cover raised streaks pass over each half of the disk. Caudal rings from 33 to 38.

Descr.—The longest and thickest of all, since I have seen a specimen which reaches the length of 16 inches. Snout very long, and measuring double the distance between the fore edge of the orbit and the extremity of the bulging gill-cover. An elevated line, originating at the hind-head or border of the orbit, surrounds the quadrantal occiput. A shorter or longer elevated line traverses the middle of the hind-head to its end. Body higher than broad, brown, with, on each ring, two white stripes bordered with black, which coalesce with one another near the dorsal fin. Snout, and also the silvery gill-cover, spotted with black. Eyes golden. Fins yellowish or dusky brown. Entire length 16·03 inches. Length of head 3·37 inches; of snout 2·09 inches; of body 9·18 inches; of tail 6·86 inches; of dorsal fin 1·73 inch. Height of body 0·71 inch; breadth of body 0·59 inch.

Rad.—P. 25; D. 48; A. 4; C. 7 or 8.

A great number of specimens exist in the Museums of Leyden, London and Paris, brought from Java, Borneo and Macassar.

A male specimen exhibits an abnormal formation in the right side only, in that the lateral line unites with the under edge of the second caudal ring, while in all the others the lateral line is interrupted.

B. *The unbroken lateral line joined by an arc near the anus to the under edge of the tail.*

3. Doryichthys Hasselti, *Kp.*

Syngnathus brachyurus *, *Bleeker, Bijdr.* p. 16.
Syngnathus fluviatilis, *Kuhl et Van Hasselt, MSS.*

* Since the name of *brachyurus* is common to the other members of the genus, I cannot adopt it as a distinguishing appellation of the species; neither can the epithet of *fluviatilis* be used, because the fish does not frequent rivers.

Bleeker, op. cit. p. 18. This description is drawn up from a somewhat imperfect specimen.

Diagn.—The borders of each ring spinously toothed. Before the dorsal fin 20 rings, and before the anus 21. The dorsal placed on 9 rings, the first of which is the anal ring. On the gill-cover four small prominent lines exist under the medial one. Tail composed of 23 rings.

Descr.—In a female example belonging to the Leyden Museum, the snout is twice the length of the head, and is finely toothed on its dorsal aspect. The somewhat convex occiput is surrounded by two prominent lines that spring from the orbits, and has also a medial longitudinal crested line. Height of the body equal to its breadth. Twenty-three caudal rings. Eyes dark blue. Colour of the body yellowish-brown, with a brown longitudinal stripe on the edge of the back and passing forwards through the eye up to the nostril.

Rad.—P. 18; D. 41; A. 4; C. 9.

A male specimen procured at Tahiti by Lesson and Garnot exhibits on the snout traces of eight cross-bars, and a trace of a longitudinal streak near the lateral line passing over the head to above the nostril. This specimen wants the tail.

Dimensions of ♀:—Head 1·50 inch, snout 1·02 inch, body 4·73 inches, dorsal 0·83 inch, tail 2·70 inches.

Dimensions of ♂:—Head 1·36 inch, snout 0·83 inch, body 4·36 inches, dorsal 0·87 inch.

This species also attains considerable length, and may easily be confounded with *spinosus*.

Hab. Java and Tahiti.

4. Doryichthys pristipeltis.

Diagn.—The edges of the body spinously toothed, and completely checking the finger when it is drawn atlantad over them. Twenty body-rings. Dorsal fin standing on 8 caudal rings. Tail composed of 24 rings.

Descr.—Length of the snout equal to two-thirds of that of the head. No distinct denticulation on the back of the snout, but there are short spinules on both its sides. A depression between the elevated orbits. A raised medial line on the occiput, and one also proceeding from each orbit. Back and belly equally broad. Length of head 0·99 inch, of snout 0·67 inch, of body 2·99 inches, of tail 1·69 inch.

There is a female specimen in the Vienna Museum unaccompanied by an indication of the sea in which it was found.

5. Doryichthys lineatus, *Kp.*

Syngnathus lineatus, *Valenc.*
Typhlus D'Orbignyi, *Bibron.*

Diagn.—From 15 to 17 rings before the dorsal fin, and from 18 to 20 before the anus. The dorsal placed on 9 or 10 rings, three of which belong to the body. In well-preserved specimens there are 3 silvery stripes along the lateral line; and on the under part of the snout from 3 to 5 black spots.

Descr.—The crested snout is nearly twice as long as the head. Occiput scarred with three prominent lines in the middle, and two proceeding from the orbit. Rough cross streaks on the gill-cover, which has one prominent line in the middle, and beneath it two or three. From 23 to 27 caudal rings. The ground-colour is yellowish-brown. Six male specimens from Bahia and Vera Cruz have a uniform blackish-brown colour, and a bronze lustre on the head and gill-cover. Length of head 1·02 to 1·32 inch, of snout from 0·63 to 0·71 inch, of body 3·74 inches, of dorsal fin 0·79 inch, of the tail 2·56 inches.

Rad.—P. 19; D. 40; A. 3 or 4; C. 10.

The Paris Museum contains a great many specimens from Bahia, Mexico and Guadaloupe.

6. Doryichthys auronitens, *Kp.*

Diagn.—Edges of the body finely toothed. Anterior to the dorsal there are 18 rings, and 20 up to the anal ring; 9 rings sustain the dorsal, two of them being body-rings. Length of the tail equal to the distance between the anus and the front of the orbit.

Descr.—This species presents a slender, greatly elongated and very rough form. Its snout is longer than the distance between the fore border of the orbit and the extremity of the first breast-ring. The crest above the nostrils is toothed. Two prominent lines traverse the flat gold-coloured operculum beneath the principal elevated medial line. Caudal rings 23. Colour brown with a golden lustre. Two indistinct whitish lines run along the lateral line.

Rad.—P. 20; D. 41 or 42; A. 3; C. 9.

Length of head 0·83 inch, of snout 0·51 inch, of body 0·59 inch, of tail 1·93 inch; height of body 0·16 inch; breadth of body 0·12 inch.

There is a female specimen in the Leyden Museum, sent from Macassar by M. Piller.

This species resembles *Dor. Dumerili*, but is distinguished by its longer tail and fewer body-rings.

7. Doryichthys Dumerili, *Kp.*

Diagn.—Edges of the body distinctly toothed, with a long spine on the end of each ring. There are 16 rings before the dorsal fin and 18 up to the anal. The dorsal fin stands on 8 rings, of which two belong to the body. Under the principal prominent opercular streak, there are three lines in relief. Tail reaching to half the length of the snout.

Descr.—Length of the snout equal to the distance between the fore border of the orbit and the root of the pectoral fin. A toothed crest on the forehead and snout. A line rising in relief over the nostril up to the mouth, and from the orbits to the occiput. The edge of the back reaches to the last ring of the dorsal fin, and the upper edge of the tail ends at the foremost pair of rings of the dorsal. There are 24 rings in the tail.

Rad.—P. 18 to 20; D. 34; A. 3; C. 9.

Colour yellowish-brown with numerous dark points. Eyes and gill-covers silvery and speckled. Caudal fin black. On a dried example there are two silvery stripes along the lateral line and rim of the belly. On the tail there are five distinct yellowish silvery longitudinal streaks. Length of head 0·63 inch, of body 1·81 inch, of dorsal fin 0·47 inch, of tail 1·62 inch.

A specimen in the Paris collection, of unknown origin.

8. Doryichthys millepunctatus, *Kp.*

Diagn.—Edges of the body serrated; 18 rings before the dorsal fin and 21 before the anus. Dorsal standing on 9 rings, 7 of them caudal ones. The entire body whitish, dotted with black on the belly. An interrupted longitudinal stripe passing over the side through the eye.

Descr.—Snout equal in length to the distance between the fore part of the orbit and the further extremity of the ring that supports the pectoral fin. From three to seven prominent lines under the chief keel in the midst of the gill-cover.

Dimensions of ♂ :—Head 0·83 inch, snout 0·51 inch, body 2·52 inches, dorsal 0·59 inch, tail 1·58 inch.

Dimensions of ♂ :—Head 1·14 inch, snout 0·68 inch, body 3·55 inches, dorsal 0·69 inch, tail 2·05 inches.

Dimensions of ♀ :—Head 0·91 inch, snout 0·59 inch, body 2·72 inches, dorsal 0·67 inches, tail 1·58 inch.

Two pairs of males and females from Madagascar.

A larger male from the Isle of Bourbon has only whitish points on the scales that project over the egg-pouch. The ground-colour is blackish-brown. The gill-cover has a golden lustre. In one specimen I noticed a silvery longitudinal stripe on the back, but this is probably merely accidental.

Paris Museum.

9. Doryichthys aculeatus, *Gray*.

Diagn.—Edges of the body toothed; 20 body-rings; 17 rings before the dorsal fin, which stands upon 8, of which three belong to the body. Caudal rings 24.

Descr.—The specimen which exists in the British Museum, in a very mutilated condition, came from Egypt, and was the gift of Dr. John E. Gray. The snout is toothed. Head 0·89 inch long, snout 0·53 inch, body 2·61 inches, tail 1·93 inch.

Genus 4. HEMITHYLACUS, *Kp.*

Diagn.—The snout, having a length exceeding that of the body, has on its dorsal aspect a two-edged border, whose under part is rounded. The body is compressed.

Descr.—Head finely shagreened, without a crest. Length of the snout from the middle of the eye equal to that of the head. The fins are not much developed, with the exception of the dorsal, which is very long. In the males an egg-pouch extends from the breast-ring to the anus. At the last ring of the pectoral fin the edge of the concave back unites with the caudal edge, but a branch running near the dorsal fin extends to the anal ring. In age each ring has a scar near its dorsal border, and one also on the indistinct under-border of the tail-rings. On the indeterminate lateral line there are also scars which descend to the anal ring.

1. Hemithylacus leiaspis, *Kp.*

Syngnathus leiaspis, *Bleeker, Bijdr.* p. 20.
Typhlus Goudoti, *Bibron, Par. Mus.*
Syngnathus micropterus et compressus, *Kuhl et V. Hass. MSS.*

Descr.—Snout short, the head more stretched out and finely warty. In the oblong operculum there is no distinct trace of a medial line. Before the dorsal fin there are 13 rings, and 17 up to the anal ring; each ring being interrupted at its extremity. From 30 to 33 caudal rings. The nape and long breast-ring keeled. A crest more or less distinct exists on the hind-head. In the young fish there is a prominent line between the orbit and hind-head.

Rad.—P. 17; D. 58; A. 3; C. 9.

Large specimens have the following dimensions: — Total length 7·29 inches; length of head 0·63 inch; of the distance between the tip of the snout and anal fin 2·99 inches; of dorsal fin 1·46 inch; of tail 4·29 inches. Greatest height from the middle of the round acutely-ridged belly to the border of the back 0·35 inch.

A male measuring 6·32 inches has an egg-pouch 1·01 inch long. Its colour is smutty-brown with paler breast and belly.

The Leyden Museum possesses one male and three female specimens from Java, and in the Parisian collection there are four female examples from Madagascar, procured by M. Goudot.

Genus novum, 5. *Doryrhamphinarum.*

Syngnathus heterosoma, *Bleeker*, *Bijdr.* p. 15.

Diagn.—Body lower in the middle than more anteriorly or posteriorly.

Descr.—Body much elongated, anteriorly heptagonal, posteriorly tetragonal, having a height varying from the 28th to the 35th part of its length, somewhat higher than broad, and in the middle distance between the eye and the anus seeming as if separated into two parts by a thickish waist. Length of the head contained five times or five times and a quarter in that of the body. The rostro-frontal profile is concave before the eyes, which latter have a diameter amounting to the 10th or 12th part of the length of the head. Snout about thrice the length of the post-ocular portion of the head, compressed, and with a height at its slenderest part equal to the ninth or tenth of its length. Crown of the head flattish and wrinkled, with a very low medial crest. The orbits, and short lateral rostro-ocular, and post-ocular toothed-crenated. A medial slightly denticulated crest traverses the operculum longitudinally, and on each side of it there are more or less divergent ascending or descending striæ. Body-rings 26; caudal ones 31 to 38; each ring being transversely

striated, with interstitial oval or subrhomboidal plates smooth, and as if divided by a medial impression. The keels of each shield are slightly retro-serrated, and end in a spine pointing backwards: the ventral keels, however, have either no spine or one much shorter than the others, and the medial ventral keel is so low that the body appears to be hexagonal. In the males the laminæ of the ventral keels from the head down to the vent are open and erect. The anus is placed in the posterior half of the body. The tail, excluding its fin, is longer than the trunk of the body, excluding the head, and a little shorter than the body and head together. The dorsal fin begins on the 21st body-ring, half of its length being before the anus, ends on the 7th or 8th caudal ring, and is lower in height than the body. The anal is small, and the caudal diminutive. Colour of the dorsal aspect of the body shining green, of the ventral aspect yellowish or silvery; on the sides there is an oblong brownish vertical spot in the middle of each shield. The interstitial laminæ are shining and silvery, and there is a black dot at the base of each spine of the lateral keel. Dorsal and pectoral fins dilute green, the caudal blackish and the anal yellowish.

Rad.—Br. 3; D. 65–68; P. 22, p. m.; A. 4; C. 10?

This description (quoted from Bleeker) leaves me in no doubt of this species being the type of a genus hitherto undescribed, which must take its place in my subfamily of *Doryrhamphinæ*.

Subfamily 4. NEROPHINÆ.

The eggs, uncovered by membrane, distributed in rows on the breast and belly of the males.

Genus 1. MICROPHIS, *Kp.*

Diagn.—Body heptangular, composed of very rough rings and continuing of equal thickness up to the elongated tail. Five fins.

Descr.—Buchanan Hamilton, in his description of *cuncalus*, remarks that "in September the female has the breast and belly covered with eggs, which adhere firmly to the scales." And in his description of *deocata* (also of this genus) he says, "but when the *female* carries her eggs the splendid colouring fades, except on the margins of the belly, which are yellow and expanded for the reception of two rows of globular eggs, which hang to the belly until they are hatched." Hamilton was not aware that it is the male and not the female that carries the eggs

until they are hatched and the young come forth. It is impossible to bring the two species here alluded to into the genus *Nerophis*, and I am therefore under the necessity of introducing a new generic name into the science.

1. Microphis deocata, *Kp.*

Syngnathus deocata, *Hamilt. Fish of the Ganges*, p. 14.
Dr. Gray, Ind. Zool., a figure.

Diagn.—Snout longer than that of *cuncalus*. Body composed of 16 rings, the tail of 32.

Descr.—Dorsal fin standing on 6 rings, two of them belonging to the body. Colour brown generally, bright red under the lateral line and dotted with blue. The species inhabits the Testa, Kurwalayi, and other rivers of Puraniya or Mithilla in the north of Bengal and Behar. I have not seen the species, and this notice of it is taken from Buchanan Hamilton's work above quoted.

Rad.—P. 15; D. 30; A. ...; C. about 17.

2. Microphis cuncalus, *Kp.*

Syngnathus cuncalus, *Ham. Fish of the Ganges*, p. 12. no. 1.
Typhlus Dussumieri, *Bibron, MS. Paris Mus.*

Diagn.—A prominent line divides the silvery gill-cover into two similar parts. The lateral line unites in an arch with the under border of the first caudal ring. Ten rings; 3 of them belonging to the body sustain the dorsal fin, before which there are 14 rings, and up to the anal ring there are 17.

Descr.—The uncommonly rich Parisian collection possesses seven female specimens, which were sent from Malabar by Dussumier. It is an easily distinguished species, slender, elongated, and up to the extremity of the dorsal fin equally thick. The somewhat up-turned snout projects a little from the fore-border of the orbit, and is traversed inwardly by a prominent line, which extends from the hind-head to the nasal end. Occipital shield rhomboidal and keeled. Tail somewhat longer than the body, composed of 25 to 27 rings. The upper dorsal edge reaches to the last ring, and the edge of the tail extends to over the anal ring. Snout dark brown, and the body has dark bands down to the lateral line. The caudal cross-bands are

broader and encircle the tail. There is a white border to the black caudal fin.

Rad.—P. 16; D. about 50; A. 2; C. 8 or 9.

Length of the body 1·77 inch, of the head 0·46 inch, of the dorsal fin 0·67 inch, of the tail 2·17 inches, of the caudal fin 0·24 inch.

Hamilton's excellent account of the species represents the colour and markings in the following terms. The colour is green on the dorsal aspect, white on the ventral one, with a silvery lustre on the sides. Divers dark lines crossing each other on the back form a network, and on each side a longitudinal stripe is formed by rows of spots. Hamilton procured this fish from the mouths of the Ganges near Calcutta.

Dr. Bleeker says of his *Microphis cuncalus* that the body is composed of 22 rings, the tail of 22, and that the dorsal fin stands on 8 rings, of which two belong to the body. If these numbers are correct, the *cuncalus* of Bleeker cannot be that of Hamilton.

Genus 2. NEROPHIS, *Rafinesque* (1810).

Nerophis et Syngnathus, *Rafinesque.*
Acus, (*Willughby*) *Swainson* (1839).
Acestra, *Jardine.*
Nematosoma, *Eichw.* (a term previously used by Koch to designate a genus of Spiders) (1839).
Scyphus, *Risso* (1826).

Diagn.—Neither pectoral nor anal fin. Body cylindrical, without distinct edges.

a. *Species having a rudimentary caudal fin.*

1. Nerophis anguineus.

Syngnathus anguineus, *Jenyns, Cat. Brit. Vert.*
Yarrell, Brit. Fishes, p. 445, a figure.
Syngnathus ophidion, *Bloch*, pl. 91. f. 3. (Bloch and his draughtsman have overlooked the caudal fin, none being represented in the figure.)
Shaw, Gen. Zool. v. p. 453. pl. 179.

Diagn.—Length of the cylindrical snout equal to the distance between the front of the orbit and the extremity of the gill-plate. Colour uniform.

Descr.—A greatly elongated species having a long slender tail. Body feebly octangular. Head constituting one-eleventh of the whole length. Body-rings 28; caudal rings 64 or 65. Dorsal fin supported by 38 rays on 12 rings. Caudal fin having 5 rays. The males carry two rows of eggs. The colour is a uniform olive-green, the eyes being red. It has been taken on the Irish coast, between Brownsey and North Haven, and also in the North Sea and Mediterranean. The British Museum contains a specimen in spirits taken on the coast of Dorsetshire, and another caught off Berwick. A great many exist in the Paris Museum.

2. Nerophis Heckeli, *Kp.*

Diagn.—At the first glance this fish appears to be trigonal; but the two lateral lines, the acutely-ridged back, and the keeled belly render the body really octangular.

Descr.—The specimen in the Vienna Museum resembles *anguineus*, but the body is more slim, very thin at the broadest part, which is from the 17th to the 29th body-ring. Measured from the fore border of the orbit, the snout is as long as the distance between the same spot and the extremity of the gill-cover. Both the snout and the deep forehead are keeled. The gill-cover and hind-head are finely streaked. Of the 10 rings on which the dorsal fin stands, three belong to the body. This fin has 38 or 39 rays, the caudal 5. There are 28 body-rings and 67 caudal ones. Length of the fish 9·34 inches, of tail 4·93 inches, of head 0·75 inch.

The only specimen known to me is a female one in the Vienna Museum brought from Bogota.

3. Nerophis æquoreus.

Syngnathus æquoreus, *Linn. Syst.* i. p. 417.
Montagu, Wern. Mem. i. p. 85. t. 4. f. 1.
Penn. Brit. Zool. iii. p. 188.
Yarrell, Brit. Fishes, p. 442, a figure.
Fries in Wiegm. Arch. 1838, p. 246. t. 11. f. 3 (the head).

Diagn.—Length of the snout from the front of the orbit equal to the distance from thence to the extremity of the gill-cover. Forehead convex between the eyes. Caudal fin short and abrupt, of six rays.

Descr.—The handsomest and biggest species, attaining a

length of 2 feet. Body composed of 29 or 30 rings, and the tail of from 68 to 70. The head forms the twelfth or thirteenth part of the whole length. The female has a rudimentary dorsal fin and an octangular body, while the male has a more flat back and belly. Dorsal extended on from 40 to 44 rays, and standing on 12 or 13 rings, of which three belong to the tail. The wide and long anal opening is in the female nearly in the middle of the fish, but in the male it is placed nearer to the head. The eggs are attached to the male in from eight to ten rows. Colour brownish-yellow or beautiful deep yellow, approaching to olive-green on the back, and crossed on the body by silvery-white bars edged with brown.

This species has till now been found only on the south-west coast of Scotland, in Ireland, the Isle of Man, at Havre, and in Norway. A female measuring 20·01 inches has the head 1·65 inch long, the tail 9·75 inches, and the dorsal fin 3·15 inches long.

4. Nerophis martinicensis, *Kp.*

Syngnathus martinicensis, *Bibron.*

Diagn.—Snout measured from the front of the orbit as long as the distance from thence to the extremity of the gill-cover. There are 21 rings before the dorsal fin, and 28 up to the anal ring. The dorsal contains 42 rays, and stands on 11 rings, whereof four belong to the body. In the tail there are 64 rings.

This species resembles *æquoreus*, but it is uniformly blackish, and has a longer tail. The Paris Museum possesses examples of it through the exertions of M. Plée.

5. Nerophis hymenolomus.

Syngnathus hymenolomus, *Richardson, Voy. of Ereb. & Terr., Fishes*, p. 52. pl. 30. f. 11–13.

Diagn.—A cutaneous fin extends along the back, belly and tail, leaving only the under part of the tail naked.

Descr.—Sir John Richardson's excellent description of this very interesting species is here quoted in his own words:—

"In this *Syngnathus*, the vent is a very little posterior to the middle, and the body is much compressed, with flatly convex sides, edged on the dorsal and ventral line by broad, thickish, opake folds of skin, which double its height. The shields by

which the body is protected show very slightly through the integument, and are not angular. The upper cutaneous border is interrupted on the twenty-first shield, on the hinder part of which the dorsal begins and is continued to the thirty-third shield. On the thirty-fourth shield the border again appears, but not so broad, and it goes on decreasing in height to the eighty-eighth, where it ends; the tail at the same time growing more and more slender, and ending in a narrow point, but supporting a very small caudal, with eight simple jointed rays. The under cutaneous border ends just before the anus, around which there is a dense patch of villi, which conceal the orifice, and cover a space of the length of a shield and a half.

"The snout, measured to the fore-part of the orbit, is one-twenty-fourth part of the entire length of the fish; and the head, from the tip of the snout to the end of the operculum, forms between the twelfth and thirteenth part. The snout is compressed, obtuse above, and more acute below. A flattish space, with a faint mesial ridge equal to a diameter of the orbit, separates the eyes above. A smooth, somewhat elevated superciliary ridge on each side of this space, and extending to the nostrils, renders it concave. The operculum is obtusely oval, and it shows little pits on its surface, disposed in lines. Other parts of the head and snout show similar pits as the fish dries; but in the recent state the bones must be tolerably well covered by the integuments, and there are no rough ridges or angular points, except a projection apparently of the suboperculum, which is joined to its fellow underneath, and points directly downwards below the short vertical limb of the preoperculum. The gill-opening is very minute, and is pierced over the posterior quarter of the operculum.

"All the specimens have been kept long in spirits, and have a dull brownish tint, without spots.

"Dimensions:—

	inches.
"Length from end of snout to tip of tail.....	12·05
"Length from end of snout to vent.....	6·15
"Length from end of snout to end of gill-plate.	0·95
"Length from end of snout to gill-opening....	0·91
"Length from end of snout to eye	0·50
"Length from vent to tip of tail	5·90

"Some specimens measure 5 or 6 inches more in length.

"*Hab.* The Falkland Islands."

The two nostrils are shortly tubular and placed obliquely. In a female I found two ovaries of equal length, and measuring 2·21 inches. That which we observe in very young examples of

Nerophis lumbriciformis, viz. the cutaneous fin on the back and belly which vanishes in the older fish, forms a character to this species throughout its entire life.

b. *Species destitute of a caudal fin.*

6. Nerophis annulatus, *Kp.*

Scyphus annulatus, fasciatus et papacinus, *Risso, Hist. Nat.* pp. 185–187.
Syngnathus fasciatus, *Risso, Ichth. di Nice*, p. 70. pl. 4. f. 8.
Syngnathus papacinus, *Risso, Ichth. di Nice*, p. 69. pl. 4. f. 7.

Diagn.—Length of the snout exceeding the height of hind-head. A yellow stripe and spot bordered with black extending from the hinder part of the orbit over the gill-cover. Head constituting a sixteenth part of the entire length of the fish.

Risso describes the species under three several names. An old female possesses all the characters that he ascribes to *fasciatus*: it exhibits on each ring a dark cross-band. A male preserved in the Vienna Museum under the name of *papacinus* exhibits bluish spots surrounded with black: the under half of the belly shows rows of scars without eggs. A young female of the length of 6·30 inches is uniformly dark brownish-green without cross-bars or spots: head and posterior half of the tail marked as in the others. In a large number of specimens I could not reckon above 26 or 28 rays in the dorsal fin. In the old female, whose head I have figured, the sixth ray of the dorsal is abnormally forked. The dimensions of an old female are as follows:—Length of body 3·55 inches, of tail 7·09 inches.

A specimen in the Leyden Museum was sent from the Cape by M. Horstock. Another in the Paris collection came from Algiers. This collection possesses a great many of all ages which were fished at Nizza.

7. Nerophis lumbriciformis, *Bonap.*

Nerophis lumbriciformis, *Bonap. Cat. Méth.* p. 91. no. 818.
Yarrell, Brit. Fishes, p. 450, a figure.
Acus lumbriciformis, *Willughby*, p. 160.
Syngnathus ophidion, *Penn. Brit. Zool.* iv. p. 187. & p. 26. no. 22.
Syngnathus lumbriciformis, *Fries, Wiegm. Arch.* p. 249. t. 6. f. 5, 6.

Diagn.—Length of the snout equal to the height of the hind-head. A yellowish streak passing from the orbit over the marbled gill-cover. A yellowish stripe also from beneath the eye to the under part of the snout.

Descr.—This species is proportionally shorter than *annulatus*, and its snout is more compressed towards its extremity. It has 18 or 19 body-rings and 48 or 50 caudal rings. The dorsal fin having 26 rays stands on 7 rings, of which two belong to the body. The head forms one-eleventh or one-twelfth part of the length of the body. Colour dark olive-green, with lighter spots on the head and back. Eggs disposed in four rows on the males. Professor Fries observed in the year 1837 that very young members of this species possessed pectoral fins, and that the tail is encompassed by a fin-like membrane. Except the portion required in the construction of the permanent dorsal, this membrane is cast off at a later period in a way similar to that in which the tadpoles lose their tails. This process should be considered in connexion with the structure of *N. hymenolomus*, which, as has been already remarked, retains the cutaneous appendage during its life. *Lumbriciformis* is common on the English coast, and apparently also in the North Sea, on the German shores. A female specimen from China, belonging to the British Museum, exhibits no difference whatever from the European examples.

8. Nerophis ophidion, *Bonap.*

Syngnathus ophidion, *Linn. Syst.* i. sp. 417. no. 5; *Faun. Suec.* p. 131. sp. 1.
Eckström, die Fische von Mörkö, t. 6. f. 3, 4.
Yarr. Brit. Fishes, p. 447, a figure.
Worm Pipe-fish, *Jenyns, Brit. Verteb.* p. 488.
Syngnathus ophidion, *Fries, Wiegm. Arch.* 1838, p. 248. t. 6. f. 4.
Nerophis ophidion, *Bonap. Cat. Méth.* p. 91.

Diagn.—The straight, acutely crested snout is as long as the distance between the hinder edge of the orbit and the extremity of the gill-cover. It is as high as the hind-head, and is acutely ridged on its under part.

Descr.—This species is one of the slenderest, and in many points differs from the preceding ones. Traces of prominent lines on the compressed body and sharply-ridged belly render it heptangular. The body consists of from 29 to 31 rings, the tail of about 60 rings. The dorsal fin having from 34 to 38 rays stands on 10 or 11 rings, of which three belong to the body. In

the male the anus is nearly in the middle; but in the female it is situated more posteriorly, and thence the body is rendered longer. On the flatter belly of the male there are three or four rows of eggs.

The species is rare on the English coasts, but is common in the Swedish seas. In numbers the females surpass the males. The colour is olive-green, yellowish on the belly, with numerous, frequently round, bluish-white spots on the sides. Azure-blue stripes traverse the gill-cover. The Paris Museum possesses specimens from Naples, sent by M. Savigny; and from Algiers through Guichenot. These were named in the Museum, *Syngnathus Rissoi*.

9. Nerophis teres, *Bonap.*

Scyphus teres, *Rathke.*

Diagn.—The slenderest of all the species, and very nearly related to *ophidion*, but having a longer tail.

Descr.—Snout very slender, and when measured from the centre of the eyes equal to the length from thence to the extremity of the gill-cover. A keel traverses the snout and the middle of the forehead between the eyes. Head and snout scarred. Dorsal fin standing upon 11 rings, three of which belong to the body and the remainder to the tail. A female specimen from the Crimea, which I obtained through the kindness of Dr. Heckel from Vienna, has a body 1·97 inch long, and a tail measuring 2·99 inches. It has 28 body-rings and 70 caudal rings. Another female had the body 3·11 inches long, and a tail of 3·78 inches. A male measures along the body 2·72 inches, and along the tail 3·35 inches.

The examples in the Paris Museum were collected by Nordmann, and those at Wellenstalt came also from the same learned traveller and zoologist.

LIST

OF THE

LOPHOBRANCHII.

[The Museums in which the specimens are preserved, and the Seas wherein they were procured, are named.]

Fam. 1. SOLENOSTOMIDÆ, Kaup.

Genus 1. SOLENOSTOMUS, Lacépède.

1. *S. paradoxus*, Lac. Five ex. in the Paris collection. Tab. I. f. 1. *Asia.*

Fam. 2. PEGASIDÆ, Kaup (Bonap. in part).

Genus 2. PEGASUS, Linn.

2. *P. laternarius*, Cuv. In every collection. Tab. I. f. 2. *China; Indian Ocean.*
3. *P. natans*, Linn. In the Paris collection. Tab. I. f. 3. *Indian Ocean; Polynesia.*
4. *P. Draco*, Linn. In almost every collection. Tab. I. f. 4. *Asia.*

Fam. 3. SYNGNATHIDÆ, Bonap.

A. Subfam. HIPPOCAMPINÆ, Bonap.

Genus 3. HIPPOCAMPUS, Cuv.

5. *H. brevirostris*, Cuv. In all collections. *Europe.*
6. *H. japonicus*, Kaup. Leyden. Tab. I. f. 5, 5 *a*. *Asia.*
7. *H. Monikei*, Bleeker. (*H. fasciatus*, Kaup. Leyden.) *Asia.*

8. *H. Lichtensteinii*, Kaup. Berlin. ?
9. *H. guttulatus*, Cuv. Common. Tab. IV. f. 3. *Europe, Asia, America.*
10. *H. ramulosus*, Leach. London, Paris, Berlin, Frankfort. Tab. I. f. 6. *Africa.*
11. *H. comes*, Cantor. Leyden, Paris, London, India House. Tab. I. f. 7; Tab. II. f. 3 *a*, *b*, f. 4; Tab. III. f. 4; Tab. IV. f. 1 *a*, *b*, *c*, *d*. *Asia.*
12. *H. longirostris*, Cuv. Paris, London. Tab. III. f. 2. *South America.*
13. *H. bicuspis*, Kaup. Paris. Tab. III. f. 1. *West Africa.*
14. *H. algiricus*, Kaup. Paris (single specimen). *Africa.*
15. *H. punctulatus*, Kaup. Leyden (single specimen). Tab. II. f. 1. *West Africa.*
16. *H. mannulus*, Cantor. Leyden, Paris, Vienna. *Asia.*
17. *H. marginalis*, Heckel. Vienna. *Mexico.*
18. *H. fasciolaris*, Heckel. Vienna. *Mexico.*
19. *H. lævicaudatus*, Heckel. Vienna (single specimen). Tab. II. f. 2. *N. America.*
20. *H. coronatus*, Temm. et Schl. Leyden (single specimen). Tab. IV. f. 2. *Japan.*
21. *H. histrix*, Kaup. Paris, Leyden. Tab. II. f. 5. *Japan.*
22. *H. abdominalis*, Lesson. Paris, London. Tab. III. f. 3. *Australia.*

Genus 4. ACENTRONURA, Kaup.

23. *Ac. gracillima*, Temm. & Schl. Leyden (single specimen). *Japan.*

Genus 5. GASTEROTOKEUS, Heckel.

24. *G. biaculeatus*, Heckel. Paris, London, Leyden, Berlin, Vienna. *Asia.*

Genus 6. SOLENOGNATHUS, Swainson.

25. *S. Hardwickii*, Swains. London, Paris, Leyden, Vienna. *Asia.*

Genus 7. PHYLLOPTERYX, Swainson.

26. *Ph. foliatus*, Swains. London, Paris. *Australia.*

B. Subfam. SYNGNATHINÆ, Kaup.

Genus 8. HALICAMPUS, Kaup.

27. *Hal. conspicillatus*, Kaup. London, Paris. *Australia.*

Genus 9. Trachyrhamphus, Kaup.

28. *T. serratus*, Kaup. Leyden, Paris, Vienna. *Asia.*
29. *T. longirostris*, Kaup. London (single specimen). *Asia.*
30. *T. intermedius*, Kaup. Paris (single specimen). ? *Asia.*

Genus 10. Corythöichthys, Kaup.

31. *C. albirostris*, Heckel. Vienna, Stuttgardt. *S. America.*
32. *C. fasciatus*, Gray, Bleeker. Paris, London, Leyden, Berlin. *China, Indian Ocean, Red Sea.*
33. *C. vittatus*, Kaup. Paris (single specimen). *Brazils.*
34. *C. gastrotænia*, Kaup. Paris. *Wahai, Ceram.*
35. *C. brevirostris*, Kaup. Frankfort, London, Stuttgardt. *Red Sea.*
36. ? *C.? dactyliopherus*, Bleeker. *Java.*

Genus 11. Ichthyocampus, Kaup.

37. *I. Belcheri*, Kaup. London, Leyden. *China, Borneo.*
38. *I. carce*, Kaup. Leyden (single specimen). *Java.*
39. *I. ponticerianus*, Kaup. Paris, Leyden, Berlin. *Asia.*

Genus 12. Syngnathus, Linn.

40. *S. argyrostictus*, Kuhl & V. Hass. Leyden. *Java.*
41. *S. biserialis*, Gray. London. *India.*
42. *S. spicifer*, Rüppell. Frankfort, Paris, Leyden. *Africa.*
43. *S. Kuhlii*, Kaup. Leyden, Paris. *Java.*
44. *S. flavescens*, Kaup. Leyden (single specimen). *Tripoli.*
45. *S. pelagicus*, Linn. In all the Museums. *The whole world.*
46. *S. Temminckii*, Kaup. Leyden (single specimen). *Cape of Good Hope.*
47. *S. brevirostris*. Hempr. & Ehrenb. Berlin. *Trieste.*
48. *S. Agassizi*, Michahelles. London, Paris, Vienna, Berlin, Leyden. *S. Europe.*
49. *S. Cuvieri*, Kaup. Leyden, Paris. *N. Europe.*
50. *S. abaster*, Risso. Paris. *Mediterranean.*
51. *S. Muræna*, Kaup. London, Paris. *Africa.*
52. *S. Rousseaui*, Kaup. Paris. *Martinica.*
53. *S. Phlegon*, Risso. Paris, London, Vienna, Leyden. *Mediterranean, Cape of Good Hope.*
54. *S. Acus*, Linn. In all collections. *N. of Europe.*
55. *S. brachyrhynchus*, Kaup. Paris (single specimen). *Isle of France.*
56. *S. variegatus*, Pallas. Paris, Berlin. *Taurica.*
57. *S. rubescens*, Risso. Paris, Leyden. *Eastern Atlantic.*

58. *S. tenuirostris*, Rathke. London, Paris, Leyden, Berlin, Vienna. *S. of Europe.*
59. *S. fasciatus*, Tam. & Kay. Paris. *N. America.*
60. *S. Delalandi*, Kaup. Paris, Berlin. *Cape of Good Hope.*
61. *S. Schlegeli*, Kaup. Leyden, Paris, London. *Japan, China.*

Genus 13. LEPTONOTUS, Kaup.

62. *L. Blainvillii*, Kaup. London, Paris, Berlin. *S. America, Australia.*
63. *L. semistriatus*, Kaup. London (single specimen). ?

Genus 14. SIPHONOSTOMUS, Rafinesque.

64. *Siph. pyröis*, Bonap. Vienna. *Mediterranean.*
65. *Siph. typhle*, Bonap. In all collections. *N. of Europe.*
66. *Siph. Rondeletii*, Kaup. Paris. *Mediterranean.*
67. *Siph. argentatus*, Kaup. Paris. *Trieste.*
68. *Siph. rotundatus*, Bonap. Paris. *Trieste.*

Genus 15. LEPTÖICHTHYS, Kaup.

69. *L. fistularius*, Kaup. Paris (single specimen). *King George's Sound.*

Genus 16. STIGMATOPHORA, Kaup.

70. *St. Argus*, Kaup. London, Paris. *Australia.*
71. *St. nigra*, Kaup. Paris (single specimen). *Tasmania.*

C. Subfam. DORYRHAMPHINÆ, Kaup.

Genus 17. DORYRHAMPHUS, Kaup.

72. *D. excisus*, Kaup. Paris, Berlin. Tab. III. f. 5. *Red Sea.*

Genus 18. CHÖEROICHTHYS, Kaup.

73. *Ch. Valencienni*, Kaup. Paris (single specimen). Tab. II. f. 6. *Isle of France.*

Genus 19. DORYICHTHYS, Kaup.

74. *D. bilineatus*, Heck. Vienna. Tab. I. f. 8. ? *Asia.*
75. *D. spinosus*, Kaup. Leyden, London, Paris. *Asia.*
76. *D. Hasselti*, Kaup. Leyden, Paris. *Java, Tahiti.*

77. *D. pristipeltis*, Heck. Vienna. ?
78. *D. lineatus*, Kaup. Paris, Stuttgardt, Berlin. *S. America.*
79. *D. auronitens*, Kaup. Leyden (single specimen). *Macassar.*
80. *D. Dumerili*, Kaup. Paris (single specimen). ?
81. *D. millepunctatus*, Kaup. Paris (single specimen). *Madagascar.*
82. *D. aculeatus*, Gray. London (single specimen). *Egypt.*

Genus 20. HEMITHYLACUS, Kaup.

83. *H. Goudotii*, Kaup. Paris, Leyden. *Madagascar, Java.*
84. *Syngnathus heterosoma*, Bleeker. In no European collection. *Borneo, in rivers.*

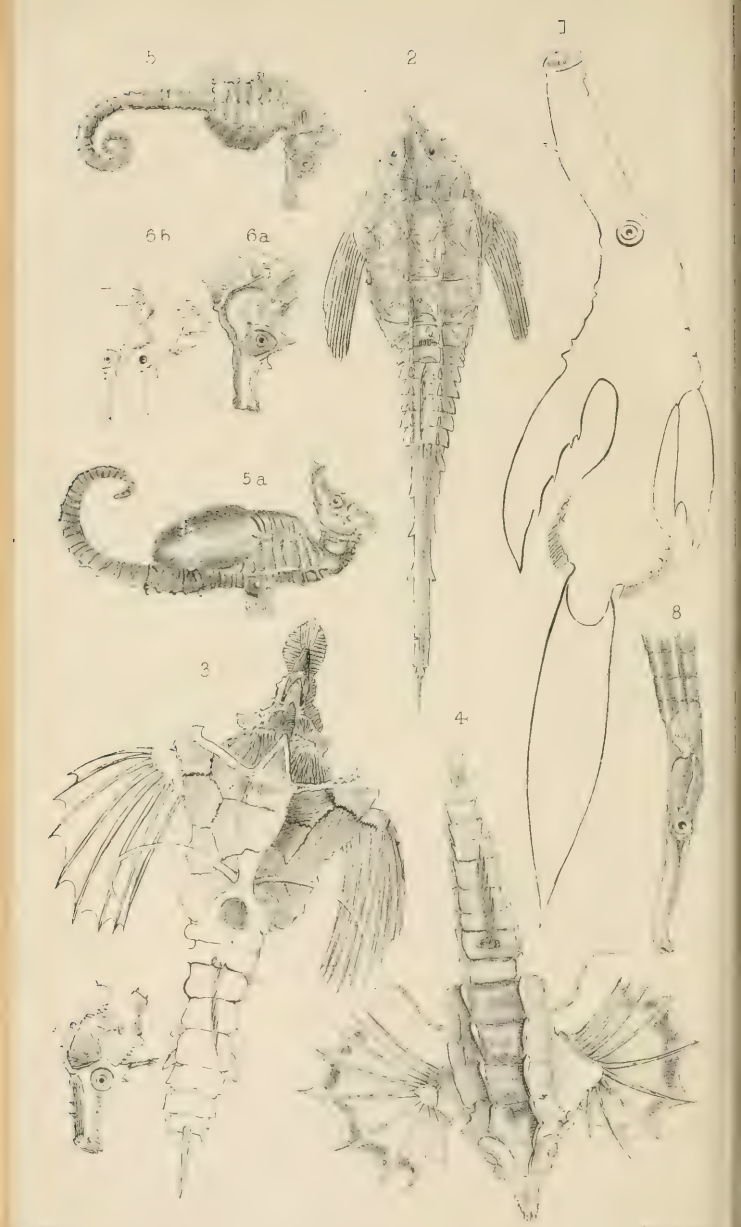
D. Subfam. NEROPHINÆ, Kaup.

Genus 21. MICROPHIS, Kaup.

85. *M. deocata*, Kaup. In none of the public collections. *Asia.*
86. *M. cuncalus*, Kaup. Paris. *Malabar.*

Genus 22. NEROPHIS, Rafinesque.

87. *N. anguineus*, Kaup. London, Paris. *N. Europe.*
88. *N. Heckeli*, Kaup. Vienna. *Bogota.*
89. *N. æquoreus*, Kaup. London, Leyden, Paris, &c. *N. Europe.*
90. *N. martinicensis*, Kaup. Paris. *Martinica.*
91. *N. hymenolomus*, Kaup. London, Vienna. *Falkland Isles.*
92. *N. annulatus*, Kaup. Paris, London, Leyden, &c. *S. Europe.*
93. *N. lumbriciformis*, Bonap. London, Paris, Vienna. *N. Europe, Spain.*
94. *N. ophidion*, Bonap. London, Paris. *S. & N. Europe.*
95. *N. teres*, Bonap. Paris, Vienna. *Taurica.*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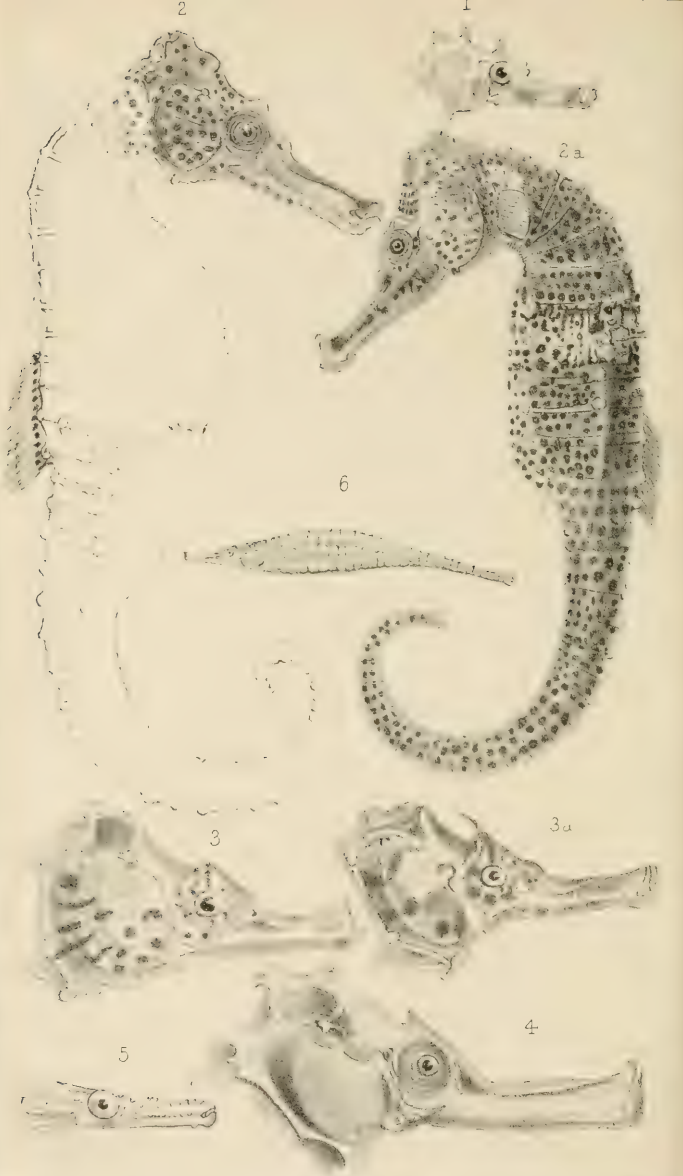
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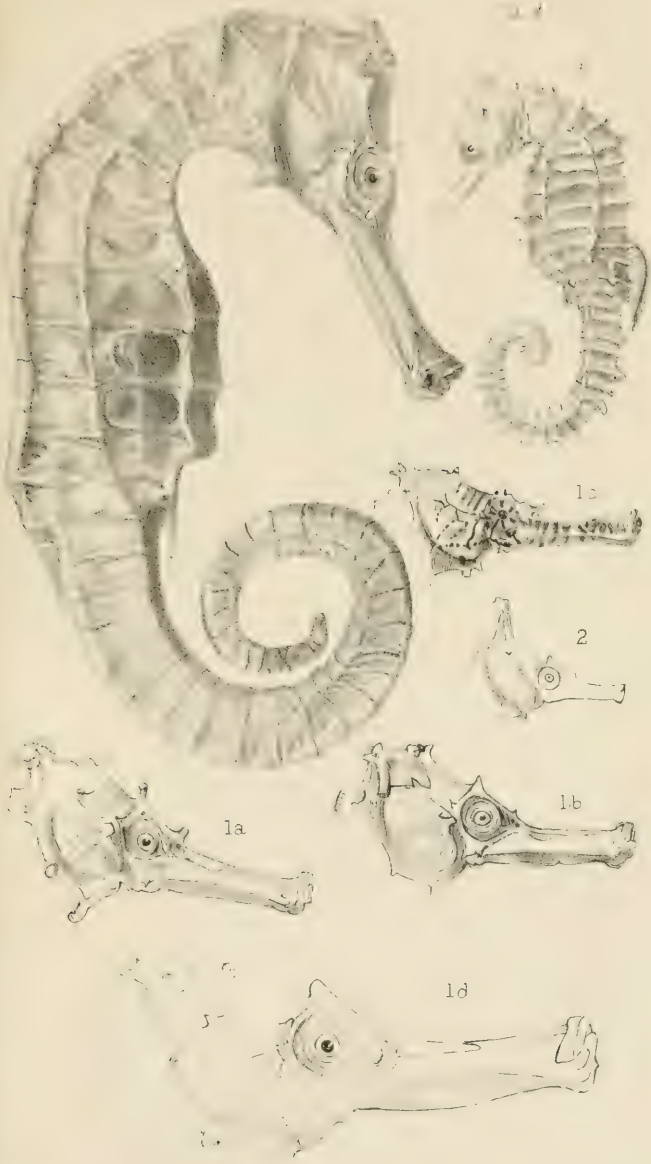

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